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NUMBER FIVE

THE POTTERY OF PECOS

DULL-PAINT WARES

Modern Painted Ware

(Diameter of bowl, 16 inches; height of olla 10 ½ inches)

ROBERT S. PEABODY FOUNDATION FOR ARCHAEOLOGY
PHILLIPS ACADEMY · ANDOVER · MASSACHUSETTS
WITH CO-OPERATION BY
CARNEGIE INSTITUTION OF WASHINGTON

THE POTTERY OF PECOS

Volume I

THE DULL-PAINT WARES

BY
ALFRED VINCENT KIDDER

With a Section on the Black-on-white Wares

BY
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TABLE OF CONTENTS

Page

Introduction 3

PART ONE

Black-on-white ware 17
Chronological position 17
General characteristics 19
Principal types 21
Rough exterior category 23
Blue-gray type 23
Whitewash slip subtype 24
Biscuitoid type 24
Clay ware subtype 25
Polished exterior category 25
Crackle type 25
Late Crackle subtype 26
Stratigraphy 26
Stratigraphic tests at Forked Lightning 27
Stratigraphic tests at Pecos 37
Summarized results of stratigraphic tests 43
The vessels from Pecos 44
Vessel forms 46
Bowls 46
Non-bowl forms 47
Decoration 48
Zone of decoration 48
Band patterns 49
Continuous band patterns 49
Divided band patterns 53
All-over patterns 60
Figure patterns 61
Quadrate patterns 61
Segment patterns 61
Pendent triangle patterns 63
Summary 64
Conclusions 70

PART TWO

Biscuit ware 73
Biscuit A 74

608

Page

Technology 74
Paste 74
Slip 74
Pigment 74
Finish 75
Vessel shapes 75
Bowls 75
Small bowls 76
Large bowls 76
Decoration 77
Band patterns 80
Bar-paneled bands 80
Standard bands 82
Awanyu bands 90
Pendent triangle patterns 90
Quadrate patterns 91
Elements of Biscuit A decoration 91
Biscuit A bowls with exterior decoration 100
Biscuit B 101
Technology 101
Paste 101
Slip 101
Finish 102
Pigment 102
Vessel shapes 102
Bowls 102
Bowls with plain rim 102
Bowls with modified rim 102
Salt-dish bowls 105
Bowls of unusual shape 105
Ollas 106
Decoration 106
Band patterns 107
Standard bands 107
Zigzag bands 116
Pendent triangle patterns 116
Awanyu patterns 118
Aberrant patterns 126
Elements of Biscuit B decoration 127

PART THREE

Modern painted ware 131
Technology 131
Paste 131

Page

Slips 132
Pigments 132
Vessel shapes 133
Bowls 133
High rimmed bowls 133
Plain rimmed bowls 134
Ollas 134
Round bodied ollas 136
High necked ollas 136
Plates 136
Miscellaneous 136
Decoration 137
Band patterns 138
Zigzag bands 138
Repeated figure bands unpaneled 138
Repeated figure bands paneled 138
Units used in band designs 142
Santo Domingo-like bands 147
All-over designs 148
Polychrome designs 148
Life forms 148

PART FOUR

Conclusions 151

LIST OF ILLUSTRATIONS

PAGE

Frontispiece. Modern painted ware, bowl and olla

Black-on-white ware

Fig. 1. Bowl outlines . . . 45
2. Bowls from graves (photograph) . . . 46
3. Bowl rim . . . 47
4. Non-bowl forms (photograph) . . . 48
5. Continuous band patterns, lines and pendent triangles . . . 50
6. Continuous band patterns, pendent and opposed triangles . . . 51
7. Continuous band patterns, opposed triangles joined . . . 53
8. Zigzag or triangular band division and repeated figures . . . 54
9. Panel division . . . 56
10. Paneled band patterns . . . 57
11. Paneled band patterns . . . 58
12. Paneled band patterns . . . 59
13. Types of oblique panel subdivision . . . 60
14. All-over patterns . . . 62
15. Methods of subdivision in all-over patterns . . . 63
16. Pendent triangle patterns . . . 65
17. Checkerboarding . . . 67
18. Bird forms . . . 69
19. Curvilinear decoration . . . 69

Biscuit ware A

20. Bowl outlines . . . 75
21. Typical bowls (photograph) . . . 76
22. Bowl rim sections . . . 76
23. Rim decorations . . . 78
24. Bowls with the Bar-paneled band . . . 79
25. Framing and paneling systems . . . 80
26. Structure of panel . . . 81
27. Bowls with "jogged line" subdivision . . . 82
28. Normal panels . . . 83
29. Treatment of the "a" field . . . 84
30. Treatment of the "c" field . . . 84
31. Treatment of the "b" field . . . 85
32. Panels with X and "jogged line" subdivision . . . 85
33. Unusual Bar-paneled band . . . 86
34. Bowls: Standard bands, *awanyus, etc.* . . . 87
35. Standard bands . . . 86
36. Analysis of Standard panel . . . 88
37. Standard panels . . . 89

PAGE

38. *Awanyu* bands 91
39. *Awanyu* heads from sherds 92
40. Pendent triangle and quadrate patterns 92
41. Dotted and checkerboarded lines 93
42. Cribbing 94
43. Filling keys 95
44. "Thoroughbred" keys 96
45. Unusual decorations 96
46. Vegetal forms 97
47. Butterflies 98
48. Feathers 98
49. Bowl with exterior decoration 99
50. Bowl with exterior decoration 99

Biscuit ware B

51. Bowl outlines 103
52. Bowl rim sections 103
53. Bowl outlines, unusual forms 104
54. Bowl rim sections, unusual forms 104
55. Bowls (photograph) 104
56. Bowls (photograph) 106
57. Olla and bowls (photograph) 108
58. Analysis of Standard panel 108
59. Analysis of Standard triangle 108
60. Variants of Standard triangle 109
61. Forms of Standard triangle 109
62. The Bent line 109
63. Uncommon treatments of "b" fields 110
64. Panels from Standard bands 111
65. Panels from Standard bands 112
66. Panels from Standard bands 113
67. Standard bands with Standard triangle 114
68. Standard bands with Sitting key 115
69. Standard bands with Standard triangle and Bent line 116
70. Standard bands 117
71. Zigzag bands 117
72. Pendent triangle patterns 119
73. *Awanyu* bowls 120
74. Exteriors of *awanyu* bowls 121
75. Band *awanyus* 122
76. *Awanyu* heads 123
77. Aberrant *awanyus* 124
78. Bowls with unusual decorations 125
79. Pattern from fragmentary bowl 126
80. Unusual decorations from bowl interiors 127
81. Naturalistic figures 128
82. Birds 129
83. Bird-like rim decorations 129

Page

Modern painted ware

84. Vessel outlines 133
85. Bowl rim sections 134
86. High rimmed bowls 135
87. Ollas and bowl (photograph) 136
88. Ollas 137
89. Band patterns, zigzags and allied arrangements 139
90. Band patterns, repeated figures 140
91. Band patterns, various methods of subdivision 141
92. Small units 142
93. Unusual decorations 143
94. Typical motifs 144
95. Small repeating units 145
96. Eagle feather symbols 145
97. All-over patterns 146
98. "Santo Domingo" patterns 147
99. Analysis of "Santo Domingo" patterns 147
100. Plain rimmed bowls 149
101. Ceremonial bowl 149
102. Naturalistic figures 150

INTRODUCTION

The upper Pecos valley, in east-central New Mexico, was inhabited by sedentary, agricultural Indians for the better part, at least, of a thousand years. The earliest settlement of which we have knowledge was a straggling village on the west bank of the Arroyo del Pueblo, a tributary of the Pecos river. This site, now called the Forked Lightning ruin, was occupied for a considerable time—we do not yet know how long—but its position on a flat, open plain apparently exposed it unduly to attack, for eventually it was abandoned and its people moved across the arroyo to the top of a small steep-sided sandstone mesa and founded—for a guess about 1200 A.D.—the pueblo of Pecos, a town which became one of the largest and most important in the whole Southwest, and which was occupied continuously until 1838.[1]

Like all Pueblo Indians, the Pecos were diligent potters. Their way of life required the use of many vessels for cooking and serving food and for carrying and storing water, and their supply of these fragile utensils naturally needed constant replenishment. So throughout the centuries the making of pottery never ceased; the potter's art was never at a standstill; styles grew and changed, new wares developed or were introduced and old ones dropped out of use.

The outstanding importance of pottery to the archaeologist has often been stressed. Fully to appreciate its value, however, one must understand the more general methods of archaeological research. Archaeology, to begin with, strives to reconstruct the history of people who have left few or, in most cases, no written records. It is therefore of necessity forced to deal almost exclusively with material remains, and its first step is to build up histories of material culture which in turn serve as the basis for later deductions as to the daily life and the events in the career of the peoples under investigation. Valid cultural histories, however, can only be compiled by studying series of specimens whose age, relative to each other, is known. Only from chronologically seriable specimens can dependable conclusions be drawn as to the origin and spread of culture traits and as to the improvement or decline of techniques; in other words, as to the genetics of culture. But the time sequence of archaeological materials is usually very hard to establish. They are found in all sorts of places and under all manner of conditions. Very often they come from widely separated sites. They are collected in enormous quantities and in most bewildering variety. And, being undocumented, they are at first contact entirely undatable. To bring these into sequence, there must be selected certain classes of specimens which, more clearly and more easily than others, can be used as indicators of the passage

[1] For a sketch of the history of Pecos see Kidder, 1924, "*An Introduction to the Study of Southwestern Archaeology with a Preliminary Account of the Excavations of Pecos*". Other publications of the Department of Archaeology of Phillips Academy upon its Southwestern researches are: "*Pueblo Pottery Making, a Study at the Village af San Ildefonso*" by C. E. Guthe; "*The Pueblo of Jemez*" by Elsie Clews Parsons; and "*The Indians of Pecos Pueblo, a Study of their Skeletal Remains*" by E. A. Hooton.

of time, and which can serve as preliminary criteria for determining the relative age of the less readily seriated remains with which they are associated. Any class of objects to be employed in this way must possess certain indispensable characteristics. The specimens which go to make it up must be imperishable, they must be abundant and widely disseminated, and they must be of such a nature as very sensitively to register cultural change.

When, after a cursory survey of an archaeological field, a few promising criteria have been selected, the student first uses them for determining the gross distribution of all remains in that area. This results in a two-dimensional picture without historic depth. Then, in order to gain perspective, the investigator proceeds to make geographic and typological classifications and, applying such broad principles as experience has shown to be generally valid, he is enabled to draw certain deductions. The crudest and most widely diffused remains, for example, he will presume to be the oldest, central regions of former dense population he will consider to have been cultural nuclei, which at any given time will have exercised technological and artistic influence upon their peripheral contemporaries. Such deductions, however, should serve only for formulation of working hypotheses, for the principles upon which they rest are by no means universally applicable.[1] Primitive-seeming products, for instance, are often the result of degeneration and may be centuries younger than objects more finely made; central location and heavy population are not invariably accompanied by preeminence in cultural achievement. Judgment in any given case must accordingly await intensive study with detailed analysis of its results; and wherever possible the final chronological ranking of remains should be based on the irrefutable evidence of stratigraphy.

Pottery admirably fulfils the requirements of the preliminary criterion. It is practically imperishable; where it occurs at all it is usually common; and, being made from plastic clay and ordinarily decorated free-hand, it changes readily from period to period and from region to region in response to the shifting trends of style. For the purposes of the general survey it is eminently suitable; in the form of sherds it may be found scattered upon the surface of most ancient sites; it is readily classifiable and its various technological and artistic qualities lend themselves to detailed analysis. Best of all, it occurs more abundantly than any other class of artifact in the rubbish heaps, artificial fills and other man-made deposits which offer the best opportunity for stratigraphic excavation.

Pottery is useful in any archaeological field, but in the Southwest it is of exceptionally great significance. In that region good clays are everywhere easily obtainable; the aridity of the country rendered necessary the constant carrying and storage of water; the sedentary life of the agricultural tribes permitted free use of fragile vessels. Pottery therefore has constituted an important element in Southwestern culture from very early times to the present. It served the manifold purposes of the household and it was the conventional offering to the dead. Pottery, deposited in graves, left in abandoned houses, cached in caves, or scattered in sherds through middens or about former dwelling places, is the most abundant category of material available for the Southwestern archaeologist. Ceramic study

[1] This point is admirably developed by Boas (1927, pp. 6, 7.).

has played no small part in building up the surprisingly full knowledge we already possess regarding the prehistory of the area and it will become increasingly important as our investigations become more precise and their objectives are more definitely formulated.

It is now necessary to consider the place of the Pecos wares in the broader complex of Southwestern pottery and to attempt to appraise their archaeological significance. Before so doing I must disgress to state that throughout this book the so-called "Pecos nomenclature" is used, as follows:

Basket Maker I, or Early Basket Maker—a postulated stage, pre-agricultural, yet adumbrating later developments.

Basket Maker II, or Basket Maker—the agricultural, atlatl-using, non-pottery-making stage.

Basket Maker III, Late Basket Maker, or Post-Basket Maker—the pit-or slab-house-building, pottery-making stage (the three Basket Maker stages were characterized by a long-headed population, which did not practice skull-deformation).

Pueblo I, or Proto-Pueblo—the first stage during which cranial deformation was practiced, vessel neck corrugation was introduced, and villages composed of rectangular living-rooms of true masonry were developed.

Pueblo II—the stage marked by widespread geographical extension of life in small villages; corrugation, often of elaborate technique, extended over the whole surface of cooking vessels.

Pueblo III, or Great Period—the stage of large communities, great development of the arts, and growth of intensive local specialization.

Pueblo IV, or Proto-Historic—the stage characterized by contraction of area occupied; by the gradual disappearance of corrugated wares; and, in general, by decline from the preceding cultural peak.

Pueblo V, or Historic—the period from 1600 A.D. to the present.

The above outline was formulated at a conference held in the autumn of 1927 at Pecos which was attended by the majority of persons then working in the Southwestern field.[1] Although it has not been accepted by all students, its terms are used in most current reports and it has been very clearly restated and explained by Dr. F. H. H. Roberts., Jr.[2]

The Pecos nomenclature amounts to no more than a working hypothesis. It synthesizes in convenient form such data as to the general trend of Southwestern development as were available in 1927. In its main outlines it is probably correct, though it applies with greater accuracy to the San Juan (which seems to have been the nuclear region for Pueblo culture) and to groups stimulated from the San Juan, than it does to outlying districts. We must, however, not allow this or any similar system to crystallize our thinking and we must always remember that the history it summarizes, being the result of the interaction of many forces, was an exceedingly complex one. But, thanks to the abundance of remains and to their excellent preservation, it will be possible, by careful and intelligent excavation and rigorous analysis

[1] For list of those present, see Kidder, 1927.

[2] 1929, 1930.

of materials, to recover in astonishingly full detail the course of that history; and by bringing to bear upon the ascertained facts the light of discoveries by other sciences, we may hope ultimately to understand the forces which have been at work and to interpret the career of the ancient Southwesterners in terms of the laws which condition human evolution. Such a result is, I take it, the goal of all anthropological and historical research.

To return to the Pecos valley. The first village, Forked Lightning, seems to have been founded not earlier than the beginning of Pueblo III, more likely toward the middle of that period (perhaps about 1,000 A.D.). The Pecos mesa, at any rate, did not become the dominant dwelling place of the neighborhood until very late in Pueblo III, probably not before 1200, possibly even after. The greater part of the occupancy of Pecos therefore falls in Pueblo IV (*circa* 1300 to 1700[1]), with its terminal phase (1700-1838) in Pueblo V.

In terms of the whole Southwest, Pecos was peripheral, even marginal. At the very first, during Forked Lightning days, small settlements did indeed exist to the east and south, but these soon vanished, their abandonment apparently coinciding with the move to the easily defended mesa and the sudden growth of the large Black-on-white village on its top. Even before the end of Pueblo III Pecos had become the last eastern outpost of the Pueblos and so it remained until it succumbed to pressure of eastern tribes at the beginning of the nineteenth century.

Being both late and peripheral, Pecos might not seem to be an ideal location for detailed and prolonged archaeological investigations. And in a way this is so, for cultures are usually best studied at nuclear, early settlements. But Pecos offers certain very definite compensations. In the first place, it was continuously inhabited for a longer time than any other known pueblo. Secondly, the peculiar configuration of its site favored the accumulation of excellently stratified rubbish heaps. Thirdly, it was a large and powerful community, occupying a highly strategic position athwart the best pass between the Pueblo country and the Plains. It was therefore an important centre of trade and in its deposits are to be found bartered objects which permit accurate chronological correlation of Pecos with other contemporary cultures, both Pueblo and Eastern. Thus, although Pecos was far from central, its size and its commercial and political prestige may reasonably be believed to have rendered it sufficiently influential to have played a significant role in the history of the area. And the stratification of its refuse heaps amply makes up for its failings in other respects and places it head and shoulders above any other site for a first attack upon the archaeological problems of the Rio Grande.

To indicate the precise bearing of the Pecos work it may be well to enlarge upon the remarks made earlier in this introduction regarding the general method of attack upon any given archaeological problem. The steps in such an attack are:

1) Preliminary survey of remains in the region under consideration.
2) Selection of criteria for ranking those remains in chronological order.

[1] Roberts (1929, p. 6) has extended the terminal date of Pueblo IV from 1600 to 1700. He considers, with good reason, that the Pueblo Revolt of 1680-1696 marks the real break between earlier and later cultural conditions.

3) Comparative study of the manifestations of the criteria to arrive at a tentative chronological ranking of the sites containing them.

4) Search for and excavation of sites in which materials may be found in stratigraphic relationship in order to check up on the tentative ranking and also to obtain a large number of specimens for morphological and genetic studies.

5) A more thorough resurvey of the area in the light of the fuller knowledge now at hand in order definitely to rank all sites and, if necessary, to select for excavation new sites which may be expected to elucidate problems raised during the course of the research.

This is obviously a formalized presentation. But it seems likely that the investigation of any archaeological field must tend to shape itself in some such way. It has done so in the Southwest as a whole and in the Rio Grande in particular.

The first step, the preliminary survey or stock-taking of remains in the Rio Grande drainage was accomplished by Bandelier in a wonderfully thorough and intelligent manner[1]. Hewett followed with a more detailed study and listing of ruins in the Jemez Plateau[2].

The second step, the selection of significant criteria, was more or less concurrent with the first. Bandelier and Hewett chose architecture and the size and location of ruins. When we entered the field, both Nelson and I turned to pottery as the most easily obtainable and the most reliable class of evidence for arranging the sites in chronological order.

The third step, the comparative study of the selected criteria, Nelson was naturally taking during his early contacts with the field, but quickly realizing the possibilities of stratigraphy, he passed with little delay to excavation. I, however, attempted a seriation, on comparative grounds, of the material then available; this eventually proved to be in the main correct[3].

The fourth step, stratigraphic excavation, was inaugurated by Nelson with immediate and brilliant success. His work in the Galisteo Basin served to place the archaeology of the Rio Grande on the firm basis of ascertained fact[4]. Following Nelson, I began, under the auspices of Phillips Academy, similar investigations at Pecos.

The fifth step, the thorough resurvey of the area in the light of the fuller and more exact knowledge derived from excavation, is being taken at the present time.[5]

To recapitulate. The preliminary survey had revealed the presence in the Rio Grande of many ruins, but their relative age, and therefore their historical meaning, was unknown. Examination of the ruins showed, however, that some contained one type of pottery, some another, and some contained several types. This ceramic diversity suggested not only that the sites covered a considerable period of time, but it clearly indicated that pottery was the best criterion for placing them in proper chronological order. A comparative study of the pottery gave reason

[1] 1892, chaps. I-VI.
[2] 1906.
[3] Kidder, 1915.
[4] Nelson, 1916.
[5] In the above summary I have been unable to evaluate the long series of excavations carried on by the School of American Research and Museum of New Mexico because their results remain, practically speaking, unpublished.

to believe that some groups were older than others. It then remained to find a ruin extensive enough to promise abundant material and one which had been occupied for a sufficiently long time to allow its rubbish heaps to contain several of the identified types in stratigraphic sequence. Pecos admirably fulfilled the above requirements. It was known to have been a large and flourishing town when the Spaniards came in 1540. It was not abandoned until 1838. And on its surface were scattered sherds representing all the types then recognized and several others which had not previously come to notice.

The excavations at Pecos and those of Nelson in the Galisteo Basin have accomplished exactly what was hoped. They have yielded abundant material for the establishment of more definite ceramic types than had hitherto been possible; and they have provided irrefutable evidence as to their relative age. Pecos and the Galisteo ruins therefore constitute the "key sites" of the fourth step in the Rio Grande archaeological program[1].

Study of the pottery was one of the principal objectives of the excavations at Pecos. It was also thought that the clearing of the ruined pueblo would develop problems only solvable on ceramic evidence. Hence our opening trenches were dug in the rubbish heaps. These middens were believed to be both large and deep and we expected to find them so stratified as to throw light on the sequence of pottery types. Furthermore, we wished to recover a great number of sherds to permit accurate description of the wares.

Pecos was built upon the flat top of a small, rocky mesa, bordered on its eastern side by an abrupt escarpment of sandstone ten to twenty feet high. This had naturally provided the inhabitants with a very convenient dumping place and the prevailing west wind was an added incentive for throwing trash, ashes and household sweepings over the eastern cliff. Accordingly, as soon as the pueblo was founded, rubbish began to accumulate at its foot. Year by year, century by century, it grew deeper, finally reaching the top of the rock and eventually building itself outward to form a broad terrace completely masking the escarpment and sloping gradually away to the plain below. There is, in places, as much as twenty feet of it and its north and south length is nearly a quarter of a mile. The refuse turned out to be far more extensive and far richer than we had dared hope. It literally teemed with sherds. It proved, indeed, so interesting that the first two years were almost entirely devoted to work therein; and in every subsequent season we did more or less trenching to acquire more material, or to check up on specific points raised by the laboratory study of the collections.[2]

The first trenches were started at the extreme eastern margin of the rubbish. The deposit here was found to be both shallow and mixed with material washed down from above. It was only after we had got well uphill that we came into heavy, undisturbed culture.

The method of excavation was as follows. All trenches were dug to rock or

[1] Most unfortunately for Southwestern archaeology other duties have prevented the preparation of Mr. Nelson's final report, which would have constituted an invaluable check upon the Pecos determinations.

[2] For a description of the composition of the heap and an account, with photographs and diagrams, of the digging therein, see Kidder, 1924, pp. 17-21.

virgin clay bottom. The advancing face of the trench was kept as nearly vertical as possible and the "back dirt" was thrown well behind in order to preserve a clear floor upon which earth pulled down from the face could be turned over before it was shovelled back. Each workman, or small group of workmen, was provided with a wooden box into which were put all fragments of pottery as they came to light. The boxes, bearing the date and the number of the trench, were taken at the close of each day to a central repository where the sherds were cleaned and sorted and notes were taken upon the general run of material from that part of the excavation from which they emanated. All sherds large enough to illustrate vessel shape or design elements were saved, as well as all pieces which deviated in any way from the normal; and all specimens, however small, of wares foreign to Pecos.

At short intervals the trench faces were cut clean for observation and record of the strata and for the taking of notes upon the kinds of pottery appearing at various depths. Thus were gathered preliminary data upon the succession of wares. For more exact determinations and to collect material for typological and statistical study we relied upon stratigraphic tests.

Tests were of two sorts: "Look-over" and "Bag". "Look-over" tests consisted in taking down, little by little, a section of trench face, beginning at the surface and working toward the bottom. The sherds from each successive level were carefully looked over and their nature recorded. Representative specimens were saved, the trench floor was cleaned and attention was directed to the next level below. We made tests of this sort as a matter of routine after every fifteen or twenty feet of forward progress; and whenever there appeared any important new stratum or any representation of a ware not hitherto encountered.

The "Bag" test, so called because the specimens recovered were gathered and stored in stout paper sacks, was a much more meticulous proceeding. It was reserved for areas which gave promise of yielding unusually long sequences of material; for places where the deposit was unusually well stratified; or for parts of the midden which seemed to offer particularly good opportunity for recovering evidence upon special periods. Inasmuch as stratigraphic tests are valuable only to the extent that they represent a true picture of conditions, care was taken to choose areas for testing which gave every indication of being undisturbed from the time of deposition of the rubbish until its removal, layer by layer, as test material. The suitability of an area for test purposes was determined by observation of a face as exposed by excavation. If it showed unbroken banding and generally even trend of strata, a column, its size determined by the extent of deposit, was isolated by exposing two, three, or even all four of its sides by trenching from surface to bottom. A horizontal base line was established toward the center of this column, for measuring purposes. The exposed faces were then carefully scraped to a vertical face to reveal every line and band in the column, and the limits of each cut to be made were fixed along such lines by placing pegs at frequent intervals to guide the workmen, who were instructed to cut each layer precisely down to the row of pegs. A drawing of the column was then made showing position and thickness of every layer. In dividing the column into layers care was taken to follow a natural division, such as a layer of ash or charcoal, a hard-packed living surface, etc., rather than an arbitrary line. The

resultant layers were not always of equal volume, nor did they have necessarily a uniform trend, but they did represent the actual structure of the column, taking into account surface inequalities which existed at the time of deposition of the material. The top surface and the trenches about the column were carefully cleared of all casual sherds, and the removal of the column, layer by layer, working from the surface downward, was begun. All objects found in a layer were of course kept apart labelled with the cut number they represented, for later study. No effort was made to establish any given number of layers in a test. The strata alone determined the number of cuts made.[1]

The general digging in the eastern rubbish provided us with extensive collections of selected specimens; the tests yielded great amounts of unselected material. All this was, of course, fragmentary. Whole vessels, so necessary for determination of shapes and for study of complete decorative patterns, were recovered from the graves that filled the middens from bottom to top. The Pecos people were never lavish in the matter of mortuary offerings; at some periods they buried little or nothing, at least of an imperishable nature, with the dead; but we nevertheless managed to accumulate several hundred complete or nearly complete pieces, which were supplemented by a smaller number of restorable bowls and ollas from the rooms.

One important category of ceramic material remains to be noted, the unmixed sample. The deposition of rubbish outside the pueblo was naturally a more or less gradual process. The heap grew slowly. As it accumulated it was constantly disturbed by the washing of gullies and particularly by the digging of graves. This resulted in a certain amount of churning, sherds from deeper levels being brought to the surface; late fragments, though to a much less extent, working their way downward. In addition, a considerable amount of digging, for the sinking of kivas, etc., was done by the Indians themselves in the rubbish which accumulated on the mesa top and some of the product was thrown over the cliff, still further to contaminate the stratigraphic purity of the heap. The total amount of mixing was surprisingly small, but nevertheless its result was that no horizon in the whole eastern heap was absolutely representative of the period during which it was laid down. Hence, to determine the exact nature of the ceramic output of the pueblo at any given time, it was necessary to find beds of refuse quickly deposited and subsequently undisturbed. These were not common, but they did, now and then, turn up in abandoned rooms and kivas that had served as dumping places until full and then been sealed in by building other rooms over them or by the establishment of new plaza levels. The sherds from such places were always carefully studied, classified, and counted, and the proportions of the different wares recorded.

The pottery collection, then, consisted of selected sherds, unselected lots from the tests, series from pure deposits, and whole vessels from graves and rooms. In the field the manifold duties of excavation necessarily prevented close scrutiny of so great a mass of specimens, which accordingly had to be worked over between seasons at the museum in Andover. There the selected sherds, constituting the largest and most representative body of data, were first examined. When sorted they proved

[1] Most of this paragraph was prepared by Mr. Amsden (A. V. K.).

to arrange themselves into a number of fairly well-defined types and sub-types. We then turned to the product of the tests, counted the numbers of sherds of each variety which occurred in each cut and prepared graphs to show their numerical and chronological relationship. The result was an outline of the site's ceramic history, which was then checked, and wherever possible amplified, by pure samples from the different periods. Lastly, we restudied the selected sherds and whole vessels in order to refine our preliminary classification, as well as to gather data for technological description and for analysis of decoration.

Our material, it is true, was mostly fragmentary; but it was unbelievably abundant. The shapes of Pecos pottery were relatively simple; the decorative systems (after the riotous Black-on-white) were remarkably uniform at any given period and the patterns were of such a nature as readily to be restorable from even small sherds. Hence, with a certain number of mortuary pieces to serve as criteria of vessel form and general arrangement of design and to use for illustrative purposes, the collection proved very satisfactory. There is, too, a not inconsiderable advantage to be derived from working with fragments, for one is forced to exercise to the fullest one's powers of observation and many small but important details are taken into account which might well be overlooked in handling more perfect specimens.

The laboratory study led to recognition of eighteen principal wares; ten of these are decorated, eight undecorated[1]. The decorated wares are Black-on-white, Biscuit A, Biscuit B, Glaze I, II, III, IV, V, VI and Modern painted. Black-on-white is the oldest; it was followed by the six Glazes in the order given; the two Biscuit wares were contemporaneous with Glazes I to IV; Modern painted ware came into vogue after the decline of the Glazes and was made up to the time of the abandonment of the pueblo.

I must now return to the fifth step in the theoretical sequence of processes in archaeological method, namely, the resurvey of the field in the light of the fuller knowledge derived during the earlier stages of the investigation. In the Rio Grande, as in other parts of the Southwest, pottery has proved, on preliminary reconnaissance, to be the most serviceable single criterion; the general ceramic history of the region has been worked out by stratigraphic excavation. It remains to examine all the ruins in the area and, using pottery as our criterion, to rank them in proper chronological order. This can be done relatively quickly and very cheaply, for sherds are common at every site and little excavation will have to be made. The results may be recorded on a series of maps showing the distribution of population during the different periods of the region's occupancy by sedentary Indians. From the maps we can draw certain broad historical inferences and we shall then be in position to undertake more refined investigations to make clear the course and the meaning of that history. The survey is now going forward actively. Mr. Reginald Fisher of the University of New Mexico and Dr. Harry Mera of the Laboratory of Anthropology are collecting data for their respective institutions, not only on pottery but as to other artifacts encountered; and as to the size, ground plan and situation of ruins.

In the preceding pages pottery has been considered as if it were only valuable

[1] The count of undecorated wares is tentative; further study may serve to raise or to reduce their number.

as a tool of archaeological method. Where it occurs, it is without doubt the most useful of such tools, but it must not be forgotten that pottery is of interest and importance from several other points of view. It provides a reliable index to the technical resourcefulness of the people who made it; the vessels throw light upon the manners and customs of ancient communities; and the ornamentation of pottery provides perhaps the best of all media for studying the processes and the psychology of primitive art. But one must choose one's material very carefully. Much, for example, has been written on the evolution of decoration and many design-sequences have been arranged; they have, however, almost always been based on preconceived theoretical ideas, and the data for them have usually been selected from specimens whose relative ages were unknown. Such sequences cannot, therefore, be regarded as surely indicating the tendencies of design growth, for specimens regarded as early may in fact have been late, and development may thus have taken place in a direction opposite to the one postulated; or, again, the specimens may all have been of one period and may represent either contemporary variants of a single design-phase, or entirely unrelated parts of unsuspected sequences. It has accordingly been impossible in most cases to do more than guess as to whether any given change in design has been, let us say, from natural to conventional, or vice versa; whether toward simplification, or toward elaboration. The only safe method for the working out of development in decorative art is to build up one's sequences from chronologically sequent material, and to let one's theories form themselves from the sequences. In the case of aboriginal American art this ideal has been very hard to attain because of the scarcity of stratified sites. When, therefore, it is possible to recover, as in the pottery of the Rio Grande, a long series of relatively datable specimens, we should not fail to take advantage of the opportunity. Our data are still incomplete because they come, for the most part, from the single site of Pecos, but if the investigation is continued and the results are made available we eventually shall find ourselves in possession of a very useful body of information. We should use this material not only for the establishment of a chronological outline, but we should study it intensively for what it will reveal as to the fundamental laws of artistic and cultural development.

It would naturally have been preferable, and it was of course my original intention, to have considered the pottery of Pecos in a single publication. But pressure of other duties renders this impossible within any reasonable time. Hence it is the plan of the Department to issue, as they can be prepared, shorter papers describing specific groups of wares.

In the present volume the Dull-paint group is treated. It comprises Black-on-white ware, the two Biscuit wares and Modern painted ware. It is a true group in the genetic sense, not a mere classificational convenience, for although Dull-paint wares occupied a minor position during the ascendency of the Glazes, and while they ceased entirely to be made at Pecos during a short period, and only returned to exclusive use during the last century and a half of the life of the pueblo, yet, as will be brought out in the conclusion, they appear to be offshoots of a single uninterrupted development which was going on within the Rio Grande drainage. The reason for selecting the Dull-paint group for prior consideration is that it comprises

Black-on-white, which is not only the oldest local ware, but is the one which links Pecos with the great category of Black-on-white pottery characteristic of the earlier phases of Southwestern ceramic history. Furthermore, its latest manifestation, Modern painted ware, allies the pottery of Pecos to that of the present day pueblos.

This paper is almost purely descriptive. It contains certain conclusions as to the development, interrelation and outside affiliations of the three wares treated; and there are formulated certain specific problems raised by their study. Discussion of the more general aspects of Pecos pottery and of its bearing upon broader archaeological and artistic problems, must, however, be deferred until all the ceramic material from the site has been considered.

On the technological side the descriptions are unfortunately weak. Determinations of the physical and chemical properties of pastes, slips and pigments and microscopic examination backed by micro-photography might well have revealed qualities of morphological or genetic significance. These we had neither the knowledge nor the equipment to undertake. Our observations are therefore limited to gross features recognizable to the untrained eye and to be made out with the aid of a pocket lens. But large collections of sherds of all types are being held available for more intensive study. The Department will gladly supply series of these for research purposes at any time. Series of representative sherds have also been prepared to supplement the necessarily inadequate book presentation. By verbal description and black and white illustration one can make clear only the most obvious and strongly marked peculiarities of a pottery group. Even the best of color reproduction fails to register those subtle qualities which the ceramicist must take into account in arriving at his classifications. The "look" and "feel" of a ware are definitely characteristic, but they can be sensed only by the handling of actual specimens. For this reason sets of sherds have been selected to illustrate all types and varieties of Pecos pottery. Some of these are deposited at institutions concerned with Southwestern research and others, stored at Andover, will be lent on application to any serious student.

Vessel shapes and particularly the conformation of the bowl rim have been carefully considered. The characteristic forms of different classes of vessels are produced by very subtle changes in proportions; yet they have much classificational value. They defy verbal description and so we have depended, for their exposition, largely upon outline drawings and rim sections. In presenting the designs we have, for the same reason, made extensive use of illustrations, drawings for the most part because of the difficulty of showing complete patterns by means of photographs. The copies, however, are literal, with all irregularities retained, reproduction being as accurate as is possible when transferring to flat paper a design originally painted upon a more or less strongly curved surface.

Attempt has been made to analyze the designs, a process which consists in the dissection, so to speak, of decoration. The first step is determination of general layout; the second is consideration of the preliminary lines produced by the painter to delimit her field. There must then be studied the means employed to subdivide the field; and finally the methods used to complete the pattern and the nature of the figures which are put into it. This serves to familiarize the student with the gross

structure and the secondary treatment of patterns; and with such familiarity comes ability to make intelligent use of fragmentary material. Of even greater importance, it permits one really to understand the make-up of designs; it enables one to discount misleading similarities and to recognize hidden resemblances; it makes the study of decoration a matter of objective and demonstrable fact; it is essential for valid classification within any given group; it is equally necessary for comparisons between directly or collaterally related groups.

Some systems of design are much more difficult to analyze than others. Black-on-white in general, and that of Forked Lightning and Pecos in particular, is so variable and embodies so great a range of major and minor treatments that Mr. Amsden, in the short time available, was naturally able to do little more than block out the investigation. Biscuit ware is infinitely more simple. It possesses, in fact, one of the most rigidly standardized and consistently applied decorative systems of the entire Southwest. Modern painted ware, although less uniform than Biscuit, is easy to reduce to a few fundamental patterns and a relatively small number of minor elements. Our attempt to "break down" the decoration of these three groups, to recognize its framework and to isolate its component parts has not, we realize only too well, been as successful as it might be, but we are convinced that only by this type of investigation can we hope to solve the complex problems of Southwestern pottery. And without a thorough understanding of its pottery one cannot hope to go far in reconstruction of Southwestern culture history.

In closing this introduction it is a pleasure again to make acknowledgment of the deep obligation of the Department to the Museum of New Mexico, which owns the Pecos ruin. The Regents of the Museum at the recommendation of its Director, Dr. E. L. Hewett, generously and cordially granted permission for the excavation of Pecos, and have been extraordinarily patient in waiting for the collection which it is not only right but most desirable that they should have. A full series of type specimens, many of which are illustrated in this book, was sent to the Museum in 1925; but certain unique vessels and the bulk of the more common pieces must be held at Andover until completion of the reports.

To the Carnegie Institution of Washington the Department is also indebted for permitting the writer to devote a large share of his time to study and publication of the Pecos materials. The present report and those in preparation are really the joint product of Phillips Academy and the Institution. Since 1929 all secretarial expenses have been assumed by Carnegie Institution.

The Southwest Museum generously granted leave to Mr. Amsden for two months field work at Pecos and for six weeks spent at Andover in studying and describing the Black-on-white wares. During the excavations and in the museum Mr. Amsden was an invaluable collaborator and to him is due a very large part of whatever value the report may possess. Mrs. Amsden prepared a number of the drawings for the Black-on-white section. Mr. T. P. Amsden made the paintings of modern vessels reproduced in the frontispiece.

Mrs. Chadwick, my secretary since 1919, has spent many summers at Pecos. There she took entire charge of all specimens as they came from the trenches; and at Andover she has washed and catalogued the thousands of sherds and has mended

the hundreds of vessels recovered. She has made practically all the drawings of pottery designs; and has typed and checked the manuscript. It is impossible adequately to give thanks for her long, faithful and intelligent assistance.

To Mrs. Kidder fell the important and onerous task of sorting potsherds in the field. I would not dare to estimate the quantity of fragments which she examined during our ten years at Pecos. I doubt if any other human being has handled so much broken pottery. Her work required a thorough knowledge of types, an ability to judge as to what should be saved and what discarded, and a keen ceramic sense to recognize at a glance any sherd, no matter how small, which did not conform to local standards.

Finally, to Mr. Tex Austin of the Forked Lightning Ranch are due the most hearty thanks of the Department for permission to excavate the Forked Lightning Ruin, for allowing the party to camp during several seasons on his land, and for many other favors most graciously and cordially rendered.

PART ONE

BLACK-ON-WHITE WARE

By CHARLES AVERY AMSDEN

CHRONOLOGICAL POSITION

Pecos, like most of the large pueblos of the Rio Grande region, is usually thought of as falling within the two final periods of Pueblo history—Pueblo IV and V. Its long and apparently continuous occupation extended, however, well back into Pueblo III, and its ceramic history accords with the culture periods above mentioned: modern dull-paint wares in Pueblo V; glaze-paint wares in Pueblo IV (with the addition of the specialized dull-paint ware known as Biscuit); Black-on-white ware in its earliest period, Pueblo III. The present section is concerned only with the last-mentioned of these three diverse ceramic groups, the Black-on-white. The vanishing point of this ware was not reached, however, until well within the first phase of the Glaze period; and several of its characteristic features are assignable to latently persistent influences from Pueblo II times. To study Black-on-white without reference to its heritage from earlier wares and its influence upon those which followed, would be to leave it wholly unrelated and largely unexplained. The careful stratigraphic work done at Pecos reveals very clearly the relation of Black-on-white to its Glaze and Biscuit ware successors. Stratigraphy of course cannot do as much at the lower end of the scale, for Pecos is a relatively late site; consequently it received its initial ceramic impulse in well developed form.

Black-on-white ware carries the ceramic history of Pecos through the only change of site the inhabitants of the pueblo are known ever to have made. The original location of the community was on the western bank of the Arroyo del Pueblo or Glorieta Creek, a tributary of the Pecos River; on the eastern bank of the same watercourse the later settlement was made. The two sites face one another across the arroyo; the earlier or western ruin on a broad, open bench of land at the base of the long, high mesa which divides the Pecos Valley from the Galisteo Basin; the later or eastern ruin standing on an isolated, butte-like *mesilla*, low in height but well defended by the abrupt escarpment of sandstone which formed its sides.

The earlier ruin has been called the Forked Lightning pueblo.[1] The site known today as Pecos is on land belonging to the State of New Mexico. That the Forked Lightning site is the direct predecessor of Pecos is indicated by a number of points which do not enter into the present study. Chief among them, however, is the evidence of the pottery. The Black-on-white of Forked Lightning is beyond reasonable doubt the immediate predecessor and prototype of the corresponding ware at Pecos.

[1] Originally discovered and recorded by A. F. Bandelier (1881); referred to in the preliminary papers of the Pecos expedition as "Bandelier Bend" (Kidder, 1924, p. 30).

Forked Lightning is a pure Black-on-white site, while Pecos has only a scant showing of this ware at its lowest levels. Not long after the abandonment of the earlier village the use of glaze-paint came in, suddenly and in great strength, according to the evidence of the stratified rubbish deposits; Biscuit ware appeared very little later, during Glaze I times, and Black-on-white rapidly declined. Well before the rise of Glaze II, the second of the five glaze-paint phases, Black-on-white had virtually disappeared.[1]

The chronological position of the local Black-on-white in Pueblo prehistory is fairly well indicated by intrusive wares found both at Forked Lightning and at Pecos. Such incertitudes as exist are due to lack of precise knowledge of the age of the intrusive wares in their home territory. When these are banished by further study Forked Lightning can be dated with considerable accuracy; and the time of disappearance of Black-on-white at Pecos, as well as of the beginning of the use of Glaze and Biscuit wares, will be known.

Little Colorado Black-on-red is the most abundant as well as the most reliable of the intrusive wares. It is the only red ware which occurs in the early strata, hence it can be picked out by color alone without possibility of confusion with any early local ware[2]. At Forked Lightning the dull-paint form of this ware, with broad white line outside decoration and rounded or square rim, is most common. Aside from numerous sherds, one complete bowl and two large fragments have been found. The glaze-paint variety, however, also occurs at Forked Lightning, a specimen having been found at the lowest level of a stratigraphic test which was believed to represent an early period of occupation of the site[3]. The piece appears to be of early type, as it has broad white line outside decoration, and squarish rim. The glaze is black rather than green in color and is only semi-vitrified, as though glaze and dull black paint had been mixed, or the glaze formula not yet fully mastered.

Little Colorado Black-on-red is of less frequent occurrence at Pecos. The three stratigraphic tests described on p. 37 show only three sherds; all are glazed pieces, one having broad line and two narrow line outside decoration. However, among the sherds from the general digging at Pecos there are two fragments of the dull-paint variety. They are not necessarily contemporaneous with their location, since a vessel carried from the Little Colorado area to Pecos might well be highly prized and

[1] There exists very little published information regarding the Black-on-white ware of the Rio Grande. Material from the Pajarito Plateau is described and figured in Kidder, 1915, pp. 413-415 and pl. XV. Nelson (1916, pp. 169-172 and pl. VII; bottom row) considers this ware in the Galisteo Basin; in Kidder, M.A. and A.V. (1917, pp. 327-328) are notes on its occurrence at Pecos. Jeancon (1929) provides useful information as to the Taos valley. Sherd collections are in the Museum of New Mexico (Chapman); University of New Mexico (Fisher); Laboratory of Anthropology (Mera); Peabody Museum (Kidder); American Museum of Natural History (Nelson). The Pecos and Forked Lightning specimens are at Andover (A.V.K).

[2] Dr. Kidder says (verbally) that Little Colorado Black-on-red has been found in the Mesa Verde, at Aztec, in Canyon de Chelly, in the Upper Gila; in the Mimbres; at Corralitos Ranch, Chihuahua, associated with early Chihuahua pottery; in the El Paso region in association with the type ware of Chupadero Mesa. Nelson (1916, pp. 171-172) reports it in the Galisteo Basin; and Jeancon (1929, pp. 26-27) mentions a red ware occurring in very small percentage in the Taos Valley, which may be Little Colorado. Excavations at Tecolote, near Las Vegas, New Mexico in 1929, with which the present writer was associated, disclosed the ware at that site. It was probably known throughout the Rio Grande region in all pueblos early enough to have been contemporary with it.

[3] Test VII, see p. 32.

kept with especial care, hence might persist in use long after the time of its manufacture.

A large sherd of characteristic Upper Gila polished black interior ware, with brown paste and extremely fine exterior corrugation (13 coils to the inch), was found in the lowest layer of a stratigraphic test at Forked Lightning in rubbish which was beyond question early at that site.[1] A sherd from the Mimbres was found at Forked Lightning buried in rubbish of indeterminate relative age, while several which appear to be Chupadero ware have also occurred there.

Intrusive pottery from the San Juan country was certainly present, but so strong was the influence of that region on Pecos Black-on-white ware that such pieces cannot be distinguished with entire confidence, the suspicion always arising that they may after all be unusually good local productions. However, two sherds from the surface of Forked Lightning are almost certainly from the Mesa Verde area, and the mug shown in fig. 2, *d* was probably made in the San Juan. It has many characteristics of Mesa Verde vessels of this type, and it is the only mug found at either Pecos or Forked Lightning.

Summing up the evidence of the intrusive sherds, it appears that Forked Lightning falls chronologically into middle or late Pueblo III, although ceramically it is perhaps slightly in arrears, as will be explained later. It is contemporaneous with sites of that period in the Mimbres and the Mesa Verde, and inferentially, on the evidence of Little Colorado Black-on-red, with corresponding sites in the regions mentioned in the footnote on page 18. Specifically, it appears fairly certain that Forked Lightning was yet a young settlement when the finely corrugated polished black interior ware of the Upper Gila was being made; when Little Colorado dull-paint Black-on-red was in the ascendant, just before it gave way to glaze-paint ware with broad line outside white decoration.

Pecos proper shows Little Colorado glaze-paint ware predominant, several sherds with narrow outside white line decoration occurring there in the Black-on-white horizon; and at least one, probably the latest of this group of Little Colorado types, which has a broad glazed outside line decoration margined by narrow white lines. After the disappearance of Little Colorado ware at Pecos, the first reliable intrusive wares to appear are those of Hopi type (Jeddito Yellow and Sikyatki). These come in in considerable strength in late Glaze III and Glaze IV times respectively. Thus the western Pueblo wares, with their unmistakably individual character and their great vogue in regions remote from their home territory, provide the most reliable evidence for placing the pottery types of Pecos in their proper chronological niche in Southwestern culture history. In this connection the following quotation from Jeancon is of interest: "It is still the custom of the Pueblo people to carry gifts of pottery to their friends in other villages where they go to visit"[2].

GENERAL CHARACTERISTICS

In the course of the ten years of excavation at Pecos, a large majority of the workers in the field of Southwestern archaeology visited the operation and examined

[1] Test D, see p. 28.

[2] 1923, p. 34.

the Black-on-white ware. All agreed that, by every standard properly applicable to prehistoric Pueblo pottery, it is an exceptionally poor lot. The few who would venture an opinion as to its affiliations saw in the decorative style a resemblance to the wares of the San Juan region, which lies some three hundred miles to the northwest. Decadence, the break-down of a style intrinsically sound, was the impression made upon persons best qualified to speak.

An attempt at analysis of the characteristics which appear most striking in the ware when viewed *en masse* would probably give first place to its color, or more properly speaking, its lack of definite color. A drab gray, leaning strongly toward slaty blue, with so little contrast between slip and pigment that the decoration often is scarcely visible, sums up that feature. The rough, dead surfaces of the ware absorb much light and add to the effect of dinginess. Examination of individual fragments (for whole pieces are very rare) reveals a carelessness in brush-work which does nothing to mitigate the observer's first unfavorable impression. Broad, uncertain lines of slaty black, occasionally of a really fine deep blue, sprawl across the inner face of the sherd in bold geometric figures whose accurate spacing was obviously beyond the abilities of the decorator. Lines frequently overlap, or fall short. Errors in drawing and miscalculations of space are common. Rims frequently are wavering in contour, varying from inch to inch in thickness and form. It is easily seen that the whole vessel was as misshapen as the fragment which now represents it. Surface texture is rough and uneven, smoothing carelessly done. Slips wear and slough off, tempering matter shows through, lumps and holes occur.

These are general characteristics as revealed by cursory examination of any mixed lot viewed as a whole, and of individual sherds picked from it at random for closer inspection. They are given here to bring out the fact that Pecos Black-on-white shows those traits which are to be expected in a peripheral area, settled late in the chronological period which determined its ceramic style, with no local tradition to guide it. Much of the peculiar mixed character of Pecos Black-on-white ware can be explained (in the present state of our knowledge, at any rate) on no other grounds than these.

It has been said that well qualified observers saw in Pecos Black-on-white a resemblance to the wares of the San Juan. This resemblance will be sought in vain in the southern and western groups of San Juan pottery, those of Chaco Canon and Kayenta[1]; and even in the northern group of middle and late Pueblo III times, as typified by Mesa Verde ware, little similarity with Pecos will be noted. The likeness must be sought in that somewhat unspecialized northern category of San Juan wares, the late Pueblo II or perhaps early Pueblo III ceramics characteristic of the smaller sites of the region; and to some extent in the proto-Mesa Verde type, with its paneled band decoration of triangular figures, its multiple framing lines and full square rim. Pecos Crackle (see p. 25) ware in its best form often comes very close to this type. In general, it may be said that Pecos Black-on-white gives numerous indications of having been inspired by northern San Juan ware before the latter developed specialized regional varieties.

[1] Except perhaps in this detail: early Kayenta bowls frequently have the outcurved rim. See Kidder-Guernsey, 1919, pp. 131-132, and pl. 55.

A number of particularities noted at Pecos which have either a resemblance to or a counterpart in San Juan ware are given below, as the best means of offering concrete evidence on this delicate point:

1. Crackling of slip in Crackle ware, with often a pearly cast and blended appearance of paint and background.

2. Well-formed bowl rim, square in the best examples, often ticked.

3. Vessel forms: curved and straight-sided bowls (see fig. 1); mug, (fig. 4, *d*); raked-handle olla, bowl-and-handle ladle (*m*); high-sided canteen with horizontal loop handles (*f*). The mug is almost certainly intrusive from San Juan: and it is quite probable that some of the other vessels are also.

4. The use of a number of decorative figures and units characteristic of the San Juan, such as multiple framing lines; dotting or blocking between parallel lines (see fig. 5); checkerboarding (see fig. 17); key figures and terraces (see fig. 8); ticked triangles (figs. 10, *e;* 11, *b*); pendent triangles (figs. 5, 6); the Maltese cross (fig. 5, *c*).

5. Thin rims in early ware. A surface collection from a small site in the Mesa Verde, now in Phillips Academy, shows 6 of 8 sherds of the thin type. At early Forked Lightning the thin rim is dominant (see p. 29, Test D). Allied to this is another bit of evidence. In the same collection from the Mesa Verde occurs a large rim sherd, thin rim, triangular checkerboard decoration, which is so exactly duplicated by a sherd from Forked Lightning that a friend to whom the two were handed without explanation of their provenience tried to fit them together.

6. Paint composition. Tests of paint from both Mesa Verde and Pecos Black-on-white by the Hawley method (see p. 23 for particulars) show both to be of carbon alone, not carbon and iron as in the Chaco and elsewhere.

Two intrusive wares are relatively common at Pecos; the Little Colorado Black-on-red and the northern San Juan early Pueblo III wares. The former, with its distinctive color and specialized decoration, evidently was not imitated at all at Pecos. The latter, on the contrary, is often impossible to distinguish from local ware, and a conservative estimate of the frequency of its occurrence would do it less than justice for that reason. Often one feels that a given sherd is from the San Juan, but hesitates to class it as such because of the possibility that it was made locally.

PRINCIPAL TYPES

The foregoing paragraphs will have given some intimation of the difficulty of establishing arbitrary types in Pecos Black-on-white ware. The word arbitrary is peculiarly applicable here, for this particular ceramic group shows unusual resistance to division into types. A type, in this connection, has been defined by usage as the totality of characteristics which make a given ceramic group different from all others. Any combination of recognizable features may thus be employed, provided, of course, that factors of time, place, or people do not intervene to dispel any likelihood of relationship between wares having common traits. In other words, while

type is based largely upon internal evidence, the external evidence in the case must be in general accord.[1]

The criteria of type most commonly employed are form, color, embellishment, surface texture, and finish, rim form, slip, paint, and paste. These are general criteria, to be subdivided *ad libitum* as circumstances or individual acumen may suggest. Form is often related to thickness and size. Color involves the various hues due to color of basic materials or to the effects of firing, including smoke-blackening, whether accidental or deliberate, as well as applied coloration. Embellishment has its two main divisions of ornamentation and decoration, the latter being particularly broad in its implications of color combinations, zones of decoration, patterns, brush technique, etc. Surface texture and finish cover such points as scraping, smoothing, wiping, polishing, and the effects of these processes on the feel of the pottery to the touch. Slip and paint may be considered from the standpoint of ingredients or composition, manner of application, adhesiveness, texture, appearance, and color. Paste has its considerations of clay, kind and amount of temper, hardness, cleavage, appearance of broken edge or cross section, etc. The variability of pottery is limited only by limitation of ability to recognize it, for pottery has all the mutability of infinite combinations of minerals subjected to infinite degrees and durations of heat in firing, plus the great uncertainty of the human element involved in its manufacture and embellishment.

Type differentiation becomes then a matter of restriction rather than of multiplication of criteria. Unless types are outlined broadly enough to include a significant percentage of the local ceramic product and to have some prospect of affiliation with or resemblance to something elsewhere within the boundaries of the culture they represent, they tend to confuse rather than clarify the situation. If outlined too broadly they of course contribute less than they might had more discernment gone into their definition. To call corrugated ware or Black-on-white a type, in terms of the whole prehistoric Pueblo culture, is to state an unassailable truth but to gain little thereby. In the last analysis the matter must rest with the good judgment of the individual making the pronouncement. Fortunately, others will from time to time have occasion to cover the same ground and confirm or question his conclusions.

Considerable time was spent in the field in 1929, and in the laboratory the year following, in applying various criteria successively to groups of sherds from definite stratigraphic horizons, in an effort to determine group characteristics and lay a foundation for the establishment of types. So great is the variability of Pecos Black-on-white that one gets the strong feeling that easily recognizable, quite valid types must lurk within it. Hence thousands of sherds from both Forked Lightning and Pecos were studied and tabulated on the basis of such criteria as rim form (most reliable of all criteria in Pecos Glaze ware), color, outside decoration, paste, outside slip, outside polish, framing lines, broken framing lines, and style of decoration—under which head a number of decorative schemes were used—in a desperate effort to find some tangible feature of consistency in the group. None proved a touchstone. Every single criterion was present from earliest Forked Lightning to latest Pecos

[1] See Guthe, 1927; Gladwin, 1930, 1930a.

times, with the single exception of the outcurved rim, which appeared about the middle of Forked Lightning occupation; and every one could be found in combination with one, several, or all of the (not mutually exclusive) others. No better evidence could be desired that the Black-on-white phase of Pecos was of relatively short duration.

It was decided ultimately that a differentiation into two groups on the basis of rough exterior and polished exterior would prove a distinction broad enough to cover the greater portion of the ware. This proved also a distinction, with more numerous exceptions however, between soft and hard pastes. Accordingly these two main categories were recognized and used in a tabulated and graphic study of three stratigraphic tests at Pecos and four at Forked Lightning. The results showed the categories to possess definite chronological significance.

Rough Exterior Category

This is the dominant category of Black-on-white ware, present in considerable quantity from earliest to latest times. Two types have been distinguished: Blue-gray and Biscuitoid.

BLUE-GRAY TYPE

This type was named for its distinctive bluish-gray, or slate color.

Form and size. Practically nothing but bowls made; specimens usually about 8 inches in diameter and 3 to 4 inches in depth, with rather straight sides and bottoms distinctly smaller in circumference than the rims, a rounded conical or half-egg form (fig. 1).

Color. Bluish gray; little contrast between paint and background; usually little difference in exterior and interior color.

Slip. A rather thin slip, ranging from slate blue to whitish; applied ordinarily to interior only. Sloughs off when too heavily applied.

Paint. Carbon paint[1] often rather indecisively blue in color, almost never a good black.[2]

Decoration. A paneled band decoration, frequently extending to the very rim without upper framing line, is most characteristic of this type. Hatched triangular figures are much used.

Paste. Bluish clay, tempered either finely or sparingly with coarse sand. Paste

[1] Miss Florence Hawley (1929) describes a series of chemical tests applied to Pueblo pottery, and the results obtained. Test 2 as described therein was applied to a number of sherds of Pecos Black-on-white of all types, and the result indicated use of carbon paint without admixture of mineral colorants. Miss Hawley classes Pecos in the mineral-and-carbon paint group in her distributional maps, but she probably used Glaze sherds in her tests. Pecos glaze contains ferric and manganous oxides, according to a Swedish chemist who made exhaustive chemical tests of this ware in 1929, hence would give a different reaction to Test 2 than the Black-on-white and other dull-paint groups (Biscuit and Modern), which also indicated a pure carbon paint in the tests.

[2] Guthe, 1925, page 26, offers a possible explanation of the indecisive character of this paint. Speaking of modern San Ildefonso, he says: "The hardened *guaco* juice is stored at least a year before it is used in painting; the longer it is kept the better black it produces. If it is used during the first year, the resulting color on the vessel is a streaky blue-black." There is no way of knowing whether or not the Pecos decorators used *guaco*; but at any rate the paint was a vegetable substance, on which aging would very probably have had the same good effect. The *guaco* or bee weed is a common plant at Pecos today.

soft to hard, according to tempering, medium soft being most characteristic[1]. Interior section appears generally smooth, with occasional coarse grains of sand. No discoloration of core in firing; homogeneous appearance throughout. Exterior rough, often striated horizontally, and dusty. Handling this ware leaves hands dusty. Paste absorbent in ratio to softness; soaking increases weight considerably in short time. Has fine-sandstone feel, and wears down evenly, like sandstone, rather than chipping off.

Cleavage. Generally straight and even, with a flat cross-section from edge to edge.

Thickness. Ranges from 3/16 to 3/8 inch. Thickness decreases toward rim.

Rim form. Thin rim (fig. 3, *a-c*) most characteristic, but often round (fig. 3, *d-f*) or square (fig. 3, *g-i*). Outcurved rim (fig. 3, *j-m*) extremely rare. Thin rim sometimes squared off on edge, sometimes rounded or sharply pointed.

Chronological position. The dominant ware of early Forked Lightning times, fading almost to extinction in late Pecos time.

Subtype—Whitewash slip ware. There occurs in the same general horizon (early and middle times) with Blue-gray ware a group which differs from it notably in one particular: it has a thin outside whitewash-like slip, applied to the rough exterior of the bowl, with no apparent attempt at polishing either before or after slipping. The same slip is used inside, with an attempt at polishing which generally gives very mediocre results. The slip does not adhere well as a rule, particularly on the exterior, scaling off and often disappearing almost entirely.

The paste is generally somewhat coarser than that of Blue-gray ware, and of a less definitely slate color. Outcurved rims occur, notably among the later pieces from the tests. This group is particularly hard to characterize. It is seemingly intermediate between Blue-gray and Crackle ware, having certain characteristics of each, although bearing the greater resemblance to the former in paste, style of decoration, and lack of exterior polish.

BISCUITOID TYPE

In paste, exterior texture, and color this type bears a strong resemblance to Biscuit ware, and is therefore called Biscuitoid. It is not a proto-Biscuit in the genetic sense, in the writer's opinion, for Biscuit ware appears suddenly and in well-developed form at Pecos, with a number of characteristics entirely alien to anything to be found in Pecos Black-on-white.

Form and size. Bowls, notably large, often 10 to 14 inches in diameter and 5 to 6 inches in depth.

Color. Light brown or sandy tan background, with unusually black paint.

Slip. Thin interior slip of same color as paste. Many pieces appear unslipped, but close examination usually reveals flaking off which evidently denotes application of slip. No exterior slip.

Paint. Carbon, unusually strong and solid black color.

[1] Gauging hardness by kind and amount of temper may be fallacious; we are woefully ignorant of both methods and chemistry of firing, which may have more to do with determination of hardness than has temper. At any rate, the finer the temper the softer the paste.

Decoration. Paneled band with oblique subdivision and heavy, solid-colored triangular and key figures, most characteristic. Generally single broad top framing line. All lines bold and broad.

Paste. Brownish clay finely tempered, seemingly with fine sand, often showing black specks as if something akin to ground basalt were used. Very smooth and homogeneous in cross section, occasionally showing slightly darkened center core. Soft, scratches easily and wears down uniformly.

Cleavage. Usually straight and even, flat in cross section.

Thickness. Uniformly slightly thicker than other types. Measurements show thickness of 3/8 to 5/8 inch, rather evenly distributed throughout vessel wall.

Rim form. Varies greatly, but thin rim extremely rare. Round and square rims most frequent (fig. 3, *d-i*). Outcurved rim not uncommon.

Chronological position. Late, occurring most abundantly toward close of Black-on-white phase, although sherds of this characteristic soft brown paste are found throughout.

Subtype—Clay ware. A ware of the same general appearance, thinner and harder, seemingly because of less admixture of fine tempering matter. Gives impression of being made of almost pure clay. Sometimes has a greenish tinge. Takes very high polish, but exterior not polished. Occurs in small quantity, at very close of Black-on-white phase, largely as a bowl with straight sides and flat bottom, 6-8 inches diameter, 3-4 inches depth (see figs. 2, *a;* 4, *f, g*).

Polished Exterior Category

This category bears more general resemblance to northern San Juan wares, having less of a Rio Grande regional character than the foregoing. It is present at Forked Lightning and Pecos throughout Black-on-white times, first as a very blue ware, changing gradually to a pearly gray in late Forked Lightning and early Pecos times, finally going into a decadent, carelessly made form.

CRACKLE TYPE

The hard, glossy slip shows very characteristic fine crazing or crackling, inside and out, whence the name.

Form and size. Largely bowls, occasionally small canteens and, very rarely, ladles. Bowls vary greatly in size, showing a progressive general increase in size from early to late times. Diameters range from 4 to 12 inches, depths from 3 to 6 inches. Form generally hemispherical, sometimes slightly flattened, sometimes slightly pointed at bottom.

Color. Medium blue to pearly gray, generally lacking in strong contrast because of intermediate shade of both slip and paint. Exterior same color and finish as interior.

Slip. Smooth, softly glossy, slightly vitreous in appearance in best examples and relatively thick. Crackles finely over entire surface[1]. Same slip used both on interior and exterior, although generally less meticulously outside than in.

[1] Not to be confused with the crackling of surface paste characteristic of Basket Maker III ware, produced by protruding bits of coarse temper. The present form of crackling is probably caused by shrinkage of the thick slip in drying.

Paint. Carbon, usually not of very deep color, often a weak slate-blue.

Decoration. Paneled band patterns composed very largely of oblique and horizontal solid figures—triangles and keys on interior wall of bowl. Occasional outside decoration of encircling lines of isolated geometric figures. Hatching seldom seen. Top framing line characteristically very broad, top banding line very narrow. Single unbroken framing line almost invariable in best examples.

Paste. Bluish clay, coarsely tempered, producing a rough edge in fracture. Diligent stone-rubbing of vessel within and without before slipping seems to have brought a layer of fine clay to the surface, leaving the coarser particles of temper in the interior. Frequently shows, in cross section, broad dark firing streak in center with light marginal streaks on either side.

Cleavage. Irregular, frequently eccentric or wavering, with broken face, rough to the touch and uneven in surface.

Thickness. Varies greatly, 1/8 to 5/8 inch thickness noted; 3/8 inch a good average. Thickness generally uniform throughout wall area.

Rim form. Square rim (fig. 3, *g-i*) the usual type, round (fig. 3, *d-f*) not uncommon; thin very rare, outcurved never found in best form of ware.

Chronological position. Contemporaneous with early Blue-gray in a form much resembling that type in superficial appearance—color and type of decoration—with rather thin slip and careless outside finish. Becoming more specialized in middle Forked Lightning time, it is the dominant decorated ware of late Forked Lightning and early Pecos.

Subtype—Late crackle. Crackle ware gone decadent toward end of Black-on-white phase. Color becomes gray and dirty, slip thin, often sloughing off or showing broad cracks instead of the fine crazing of the true Crackle type. Paste becomes softer and browner, often almost Biscuitoid in appearance, less susceptible to high polish than Crackle paste. Vessel walls thicken, decoration becomes slipshod. Outcurved rim occurs frequently. Bowl size increases from 10 to 14 inches diameter in many instances, with depth of 6 inches or more. The diligent polishing and careful draughtsmanship which made Crackle type the best of all Pecos Black-on-white no longer prevail, and the resultant ware is "off color" in every detail.

STRATIGRAPHY

The preceding sections of this study have considered the Black-on-white pottery of Pecos purely from the standpoint of its ceramic character. This method, which might be termed technological as opposed to archaeological, gives excellent but incomplete results. It can be made to show in great detail the character of material recovered, but can throw little light on the chronological position and relationships of that material: on the time range it covers, its structural evolution, and its relative importance in a given time or place.

M. A. and A. V. Kidder in their "Notes on the Pottery of Pecos"[1] demonstrated the reliability of stratigraphic evidence as applied to the entire ceramic history of the site. Their method will be followed in this section in application to the Black-

[1] 1917.

on-white wares and their immediate successors, at both Forked Lightning and Pecos. Four stratigraphic tests from Forked Lightning and three from Pecos have been tabulated as to category of ware, and given graphic illustration in terms of relative percentage of wares, with the aim of establishing their place in, and relationships during, Black-on-white times. Rim form has been treated in the same manner as it bears some relation to the wares themselves, and is a diagnostic feature of more than ordinary importance in the entire range of Pecos ceramics.

Inasmuch as stratigraphic tests are valuable only to the extent that they represent a true picture of conditions, care was taken to choose areas for testing which gave every indication of being undisturbed from the time of deposition of the rubbish until its removal, layer by layer, as test material. The suitability of an area for test purposes was determined by observation of a face as exposed by excavation. If it showed unbroken banding and generally even trend of strata, a column, its size determined by the extent of deposit, was isolated by exposing two, three, or even all four of its sides by trenching from surface to bottom. A horizontal base line was established toward the center of this column, for measuring purposes. The exposed faces were then carefully scraped to a vertical face to reveal every line and band in the column, and the limits of each cut to be made were fixed along such lines by placing pegs at frequent intervals to guide the workmen, who were instructed to cut each layer precisely down to the row of pegs. A drawing of the column was then made showing position and thickness of every layer. In dividing the column into layers care was taken to follow a natural division, such as a layer of ash or charcoal, a hard-packed living surface, etc., rather than an arbitrary line. The resultant layers were not always of equal volume, nor did they have necessarily a uniform trend, but they did represent the actual structure of the column, taking into account surface inequalities which existed at the time of deposition of the material. The top surface and the trenches about the column were carefully cleared of all casual sherds, and the removal of the column, layer by layer, working from the surface downward, was begun. All objects found in a layer were of course kept apart, labelled with the cut number they represented, for later study. No effort was made to establish any given number of layers in a test. The strata alone determined the number of cuts made.

Stratigraphic Tests At Forked Lightning

The four tests made here cover the site from the extreme western to the extreme eastern edge of its main north-central portion. Most of the buildings and principal plazas of early, middle and late times lie within this area, so these four tests may be considered fairly representative of conditions throughout. It is true that Forked Lightning has not been completely excavated; but on the other hand its limits are reasonably well defined, and it is not likely that any important section of the village has escaped detection. Two types of walls—adobe in early and uncut stone in later times—with intercalation and superposition of walls afford a sound clue to relative age of the different areas tested.

TEST D

(Depth 10 feet; surface area about 5 by 11 feet)

This test was made in the rubbish which filled a round kiva excavated in the natural red clay soil of the site. All other kivas found at Forked Lightning were of entirely different character, being made by cutting off an angle of wall (usually in a plaza) with a semicircular outer wall, the resultant ceremonial room having a broad pie-slice form. The abutting of walls in rooms roundabout proved the kiva an early structure, bearing out the evidence of its unsuual form. The test was believed to have tapped an early deposit, even before the material was studied, and this belief is

GRAPH I

Test D, Forked Lightning. Wares

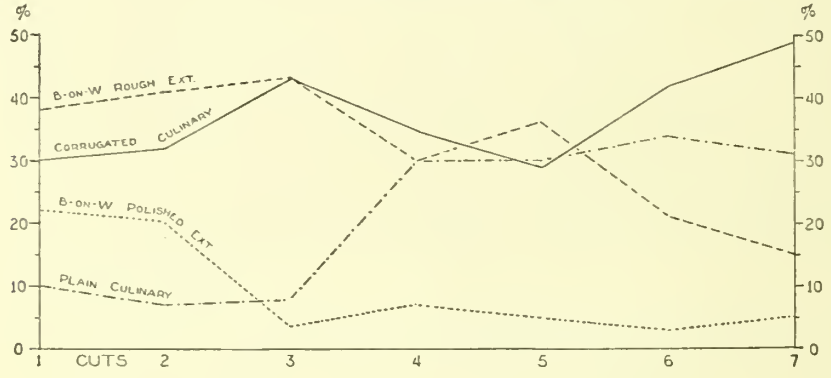


TABLE I

Test D, Forked Lightning. Wares

	Number of Sherds							Approximate Percentages						
Cut Number...	1	2	3	4	5	6	7	1	2	3	4	5	6	7
B.-on-w. polished ext. ..	63	65	20	28	9	10	12	22	20	6	7	5	3	5
B.-on-w. rough ext.	108	137	143	126	70	64	39	38	41	43	30	36	21	15
Plain culinary	30	23	27	129	59	106	78	10	7	8	30	30	34	31
Corrugated culinary....	82	104	141	144	58	129	127	30	32	43	33	29	42	49
Totals.....	283	329	331	427	196	309	256	100	100	100	100	100	100	100

greatly strengthened by the evidence of Graph I. This shows that the rough exterior category predominates greatly over the polished exterior, this predominance becoming constantly greater toward the lower layers of the test. (The cuts are numbered from the top downward, the highest number being the lowest cut.) Corrugated ware, the earlier type beyond question, is in much greater strength than Plain Culinary. Finally, the rim form graph (Graph II) reveals an excellent bit of evidence for the early character of this test: one outcurved rim is found in cut 1, two in cut 2, and thereafter none at all is found. The outcurved rim is definitely asso-

ciated with later Black-on-white times, as later graphs will show. Test D therefore seems to indicate the dominance of rough exterior Black-on-white and Corrugated culinary ware, and the absence of the outcurved rim form, in early Black-on-white times at Forked Lightning.

The sharp rise in the Plain Culinary line shown in the graph of Test D has its explanation. In the lower four cuts of this test appeared a number of sherds of a crude, hastily-made culinary ware of thick reddish paste—a ware more nearly akin to the crude pottery of a semi-nomadic people than to that of the Pueblos. It was found nowhere else, in any test or general digging, in appreciable quantity. The

GRAPH II

Test D, Forked Lightning. Rim Form

TABLE II

Test D, Forked Lightning. Rim Form

	Number of Sherds							Approximate Percentages						
Cut Number...	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Square	17	14	11	7	2	1	2	33	24	26	17	11	9	20
Round	15	17	12	6	6	2	2	20	29	28	14	34	18	20
Thin	18	26	20	29	10	8	6	35	44	46	69	55	73	60
Outcurved	1	2	×	×	×	×	×	2	3	×	×	×	×	×
Totals	51	59	43	42	18	11	10	100	100	100	100	100	100	100

suggestion has been made that this ware may be the cooking vessels made by the first comers to the site of Forked Lightning. They would arrive, presumably, without many vessels of pottery, and would therefore be pressed by necessity to equip themselves in this particular in as little time as possible—wherefore they made hastily a number of crude vessels for temporary use, and replaced them as time

permitted by a ware of better quality. The present paper is not concerned with the culinary wares, and the matter cannot be gone into further. The point is made here that this peculiar crude pottery is another indication of the early character of Test D, as well as an explanation of the sharp rise of Plain Culinary, and of the consequent relative depression of the Black-on-white types in the graph.[1]

TEST VIII

(Depth about 7 feet; surface area about 5 by 8 feet)

Test D just described cleared the round kiva. Test VIII, which was made in a later season, comprised the rubbish lying in a deep pocket above the low south wall of the kiva. The two are therefore from adjoining areas in one rubbish deposit, the latter duplicating the former from surface down to a depth of about 7 feet; or in terms of cuts, the 7 cuts of Test VIII adjoin and duplicate the first 4 of Test D. Comparison of the graphs of the two tests (Graphs I and III) will show the same sharp rise in Plain Culinary ware which indicates the approximate point of overlap and this evidence is borne out by that of depth from surface. Theoretically Cut 1 of each test should show the same relation of wares, which is not the case, although their general relationships are identical, the order Rough Exterior, Corrugated, Polished Exterior, and Plain, being maintained in each case. Closer correspondence is scarcely to be expected, for the surface cut of a test is apt to contain material not originally deposited there, particularly when that surface has been built up by water erosion, as was the case in the area of these two tests.

Test VIII offers little of particular interest after consideration of its predecessor. It emphasizes the wide gap between the two categories of Black-on-white ware at this presumably early period, and the dominance of Corrugated over Plain Culinary until the horizon of the crude cooking ware above described is reached.

Rim form is not expressed graphically for this test. So few rim sherds occurred, the test being poor in material throughout, that an expression in terms of percentage would show tremendous variability on the basis of only one or two sherds. All of these stratigraphic tests tend to be somewhat distorted by purely adventitious absence or occurrence of types at a given level, but their general trends are reliable.[2]

[1] Notes on Test D

Cut 1—3 outside decorated sherds; 1 apparent San Juan sherd.
2—1 Little Colorado glaze, broad white line outside decoration, also 1 non-glaze; 1 apparent San Juan sherd, square ticked rim, outside decorated; 1 basket-marked sherd.
3—1 basket-marked sherd.
4—9 basket marked sherds, from at least 3 different vessels; 1 little Colorado dull paint.
5—2 incised plain culinary sherds.
6—1 Little Colorado, probably non-glaze.
7—1 large Upper Gila mustard-brown sherd: polished black interior, exterior plain with band of fine corrugation near rim.

[2] Notes on Test VIII

Cut 2—1 Little Colorado glaze sherd, broad white line outside decoration.
2 outside decorated sherds.
3—2 non-bowl sherds, small olla or canteen. 1 Little Colorado dull paint, broad outside decoration.
4—2 non-bowl sherds, smallish vessel.
5—9 non-bowl sherds. 1 outside decorated sherd.

GRAPH III

Test VIII, Forked Lightning. Wares

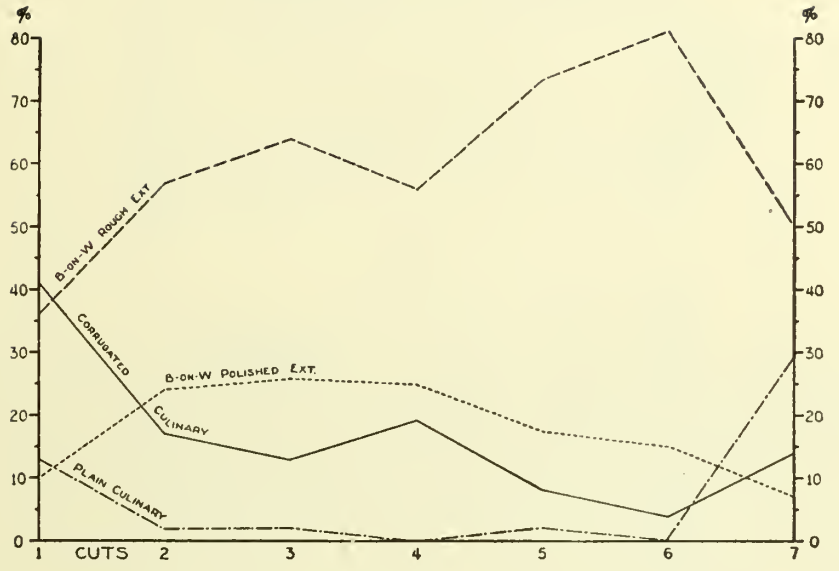


TABLE III

Test VIII, Forked Lightning. Wares

	Number of Sherds							Approximate Percentages						
Cut Number...	1	2	3	4	5	6	7	1	2	3	4	5	6	7
B.-on-w. polished ext...	4	10	15	4	7	4	1	10	24	26	25	17	15	7
B.-on-w. rough ext.....	14	24	34	9	29	21	7	36	57	59	56	73	81	50
Plain culinary	5	1	1	×	1	×	4	13	2	2	×	2	×	29
Corrugated culinary....	16	7	8	3	3	1	2	41	17	13	19	8	4	14
Totals.....	39	42	58	16	40	26	14	100	100	100	100	100	100	100

TABLE IV

TEST VIII, FORKED LIGHTNING. RIM FORM

	Number of Sherds						
Cut Number	1	2	3	4	5	6	7
Square	×	2	4	×	×	1	×
Round	2	5	8	1	6	2	1
Thin	×	×	2	1	1	4	2
Outcurved	×	×	×	×	×	×	×
Totals	2	7	14	2	7	7	3

TEST VII

(Depth 7 feet; surface area 6 by 8½ feet)

It has been said above that early Forked Lightning was a village of adobe walls, and that toward the close of its occupation stone walls came into use. A group of rooms in the west-central portion of the site shows superposition of stone upon adobe, and here Test VII was made. Its material comprised the fill of a stone-walled room (No. 126) which lay upon and almost exactly coincided in area with an earlier adobe-walled room (No. 97). Removal of the east wall of each of these rooms gave a vertical face upon which to mark out the cuts, while the remaining three walls isolated the column. The test therefore covers two distinct periods of occupation, as represented by the two types of wall. Obviously the upper room could not have been built and occupied until the lower room had been filled to provide a floor. Chronologically the lower room, material from which comprised the last 3 cuts of the test, is probably roughly contemporaneous with the round kiva of Tests D and VIII. The upper room belongs to the middle or late phase of occupation, but abutting of walls proves it not one of the very last buildings. The upper room contained little rubbish, its fill being in the main wind–and water-borne earth. The lower room was rubbish-filled, although not rich in sherds.

The graph (No. IV) of Test VII shows only the two categories of Black-on-white ware. Apparently the culinary ware of two cuts of the test was lost or wrongly marked, hence the data are not complete and are not incorporated in the graph. The constantly widening gap between the rough and the polished categories will be noted. Rim form is not expressed graphically, because of the paucity of sherds (see Table VI).[1]

[1] Notes on Test VII

Cut 1—1 Little Colorado sherd, probably dull paint.

2—1 Little Colorado glazed, broad white exterior decoration.

4—3 outside decorated sherds, rough exterior, whitewash slip.

5—1 Little Colorado dull and 1 glaze, no outside decoration visible.

5 basket marked sherds, from at least 3 vessels.

(Compare notes on Test D, showing basket marked sherds frequently occurring. This seems to be an early trait.)

GRAPH IV

Test VII, Forked Lightning. Wares

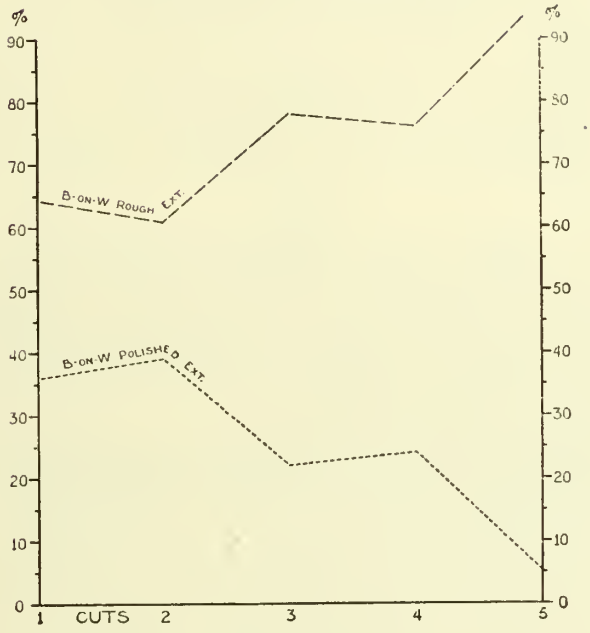


TABLE V

Test VII, Forked Lightning. Wares

	Number of Sherds					Approximate Percentages				
Cut Number	1	2	3	4	5	1	2	3	4	5
B.on-w. polished ext.	17	24	2	21	7	36	39	22	24	5
B.-on-w. rough ext.	30	37	7	66	146	64	61	78	76	95
Totals	47	61	9	87	153	100	100	100	100	100

TABLE VI

Test VII, Forked Lightning. Rim Form

	Number of Sherds				
Cut Number	1	2	3	4	5
Square	3	1	1	×	7
Round	4	5	×	4	17
Thin	3	6	1	15	30
Outcurved	×	×	×	1	×
Totals	10	12	2	20	54

TEST VI

(Depth 7 feet; surface area 4 by 7 feet)

This test was made in a plaza in the eastern-central portion of the site. The surrounding rooms were of stone masonry, and wall abuttings indicated this to be an area of very late occupation—possibly the last—before removal across the arroyo to the *mesilla* of Pecos. Depth of rubbish is so great, however, that the lower cuts probably extend well back into middle times.

A new development is shown by the graph of this test (Graph V): the polished exterior category of Black-on-white ware tops its companion in the uppermost cut of the test, declining steadily thereafter, however, as the other rises.

Test VI was considered very late on purely archaeological grounds, as has been said. The evidence of stratigraphy as applied to pottery bears out this conclusion in a most convincing manner. In order to see this it is necessary to compare the graph of Test VI with that of Pecos Tests XIX, XX, and XXI consolidated (Graph X, p. 41). The order of wares, and their relative percentage as well, are strikingly similar in the lowest cut of the consolidated graph (cut 11) and the uppermost cut of Text VI (cut 1). The consolidated Pecos graph shows Polished ending at point 40, Corrugated at 33, Rough at 22, Plain at 5. Test VI opens with Polished at 35, Corrugated at 33, Rough at 24, and Plain at 9. The two graphs could almost be joined end to end, in a series covering both Forked Lightning and Pecos. The rim form graphs (Nos. VI and XI) of these same tests show a similarity amounting almost to identity. There Square stands at 50 in each graph; Thin at 32 and 30 respectively; Round at 18 and 20 respectively; and Outcurved, if this line on each graph were projected straight across the gaps indicating no outcurved rims in those cuts, would stand at 4 and 6 respectively. Viewing this evidence, it is easy to believe that late Forked Lightning and early Pecos represent an uninterrupted sequence of occupation[1].

[1] Notes on Test VI.

Cut 1—Unstratified washed-in earth, little rubbish; cut 2 feet thick in consequence.
2—Little Colorado dull paint sherd and one apparent Mesa Verde non-bowl sherd.
3—1 Little Colorado dull paint sherd.
4—1 Little Colorado dull paint sherd.
5—1 Little Colorado glaze, broad line outside decoration.
6—1 Little Colorado glaze, broad line outside decoration.
Strata of test generally horizontal, and well defined.

GRAPH V

Test VI, Forked Lightning. Wares

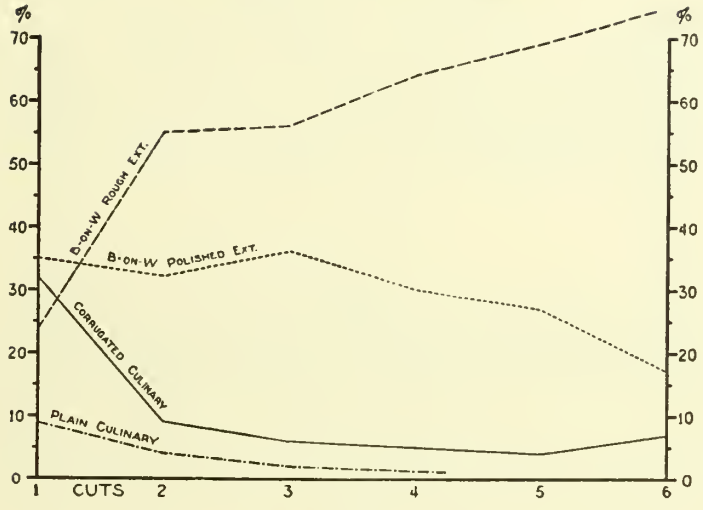


TABLE VII

Test VI, Forked Lightning. Wares

	Number of Sherds						Approximate Percentages					
Cut Number..	1	2	3	4	5	6	1	2	3	4	5	6
B.-on-w. polished ext. .	30	14	47	37	39	12	35	32	36	30	27	17
B.-on-w. rough ext. ...	21	24	73	78	99	53	24	55	56	64	69	76
Plain culinary	8	2	3	1	1	×	9	4	2	1	×	×
Corrugated culinary...	28	4	7	6	5	5	32	9	6	5	4	7
Totals.....	87	44	130	122	144	70	100	100	100	100	100	100

GRAPH VI

Test VI, Forked Lightning. Rim form

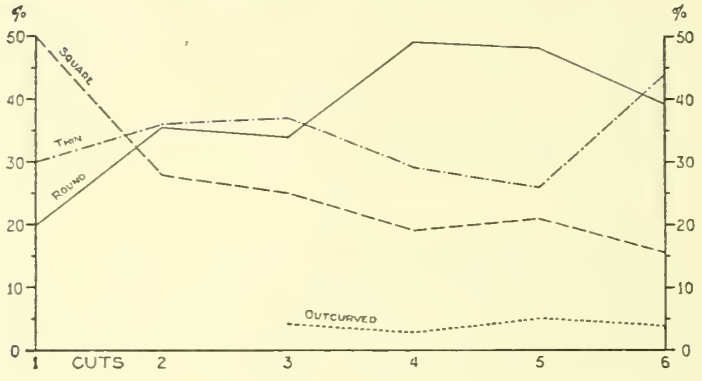


TABLE VIII

Test VI, Forked Lightning. Rim Form

	Number of Sherds						Approximate Percentages					
Cut Number..	1	2	3	4	5	6	1	2	3	4	5	6
Square	5	4	9	6	8	3	50	28	25	19	21	13
Round	2	5	12	15	18	9	20	36	34	49	48	39
Thin	3	5	13	9	10	10	30	36	37	29	26	44
Outcurved	×	×	1	1	2	1	×	×	4	3	5	4
Totals	10	14	35	31	38	23	100	100	100	100	100	100

Stratigraphic Tests At Pecos

Three stratigraphic tests made in 1929 form the subject matter of this section. All three adjoined one another in an east-west line; and since the material composing them was well banded, with generally horizontal strata and flat subsoil and surface, the results of the three can properly be combined in one, as has been done after consideration of each in its turn. The area tested was the southeast corner of the main plaza of Pecos; an area of evenly laid rubbish approximately ten feet deep, the result of an apparently continuous occupation from earliest Black-on-white (at Pecos proper) onward to at least Glaze III times. The relation of Black-on-white to the Glazes and Biscuit wares is discernible here in clear detail.

TEST XIX

(Depth 10 feet; surface area about 3 by 4 feet)

Eleven cuts were made in this as in the other two tests of this series, the average thickness of the cut being slightly under one foot. The three upper layers, having contained little or no Black-on-white material, are not given in Table IX, and Graph VII. The presence of Glaze and Biscuit in these tests requires the addition of two lines to the graphs, although it will be seen that these newcomers figure in only Cuts 3 to 6 of Test XIX; thereafter Black-on-white is the only decorated ware present. The Polished category reaches parity with the Rough about Cut 10, the two remaining at about the same level until they disappear, completely engulfed by Glaze and Biscuit, in Cut 3. Corrugated Culinary, it will be seen, survives longer than Black-on-white, although it is undergoing a constant obliterative modification. The disappearance of Plain Culinary in Cuts 10 and 11 is impossible to explain. Except in this instance it is present from earliest Forked Lightning to Glaze times, in increasing percentage from beginning to end.[1] Rim form is tabulated only in the consolidation of the three tests. (Table XIII, p. 42).

TEXT XX

(Depth 10 feet; surface area about 5 by 6 feet)

The east face of the test column lay five feet west of the house group which forms the east side of the main plaza—the location of this group having remained unchanged from Black-on-white times until after the coming of Coronado in 1541. The graph of this test (Graph VIII) shows in general the same situation as that of Test XIX. Glaze and Biscuit are carried back to an earlier time, increasing their overlap of Black-on-white ware. Glaze comes in slightly earlier than Biscuit; but one test is slender evidence, it must be remembered.

[1] So much of the culinary ware of Black-on-white times is so evenly balanced between faint corrugation and definite obliteration of coils that its graphic representation is to be interpreted only as a general trend. The gradual displacement of corrugation by smoothing is quite evident to anyone handling the sherds.

GRAPH VII
Test XIX, Pecos. Wares

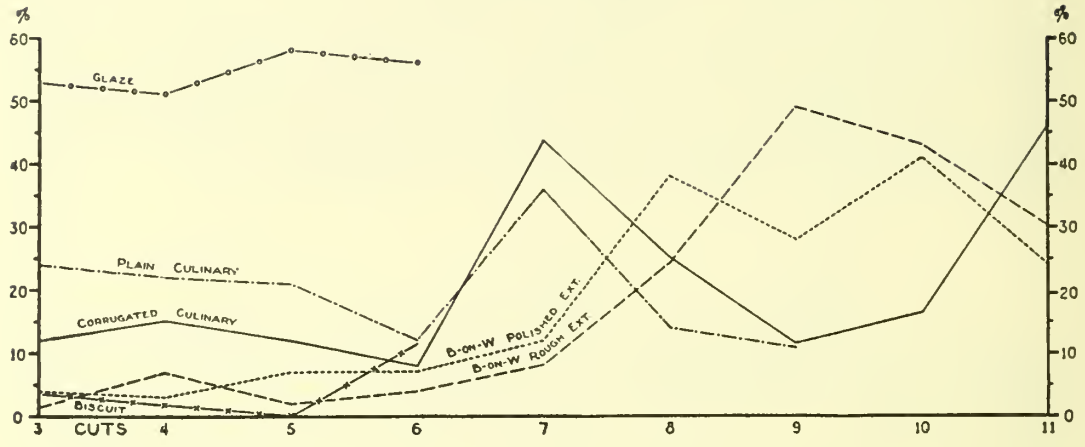


TABLE IX
Test XIX, Pecos. Wares

	Number of Sherds									Approximate Percentages								
Cut Number...	3	4	5	6	7	8	9	10	11	3	4	5	6	7	8	9	10	11
Glaze	47	32	25	49	×	×	×	×	×	54	51	58	56	×	×	×	×	×
Biscuit	4	1	×	10	×	×	×	×	×	4	2	×	12	×	×	×	×	×
B.-on-w. polished ext.	4	2	3	6	10	8	13	13	10	4	3	7	7	12	38	28	41	24
B.-on-w. rough ext.	2	4	1	4	7	5	23	14	12	2	7	2	4	8	24	49	43	30
Plain culinary	20	14	9	11	31	3	5	×	×	24	22	21	12	36	14	11	×	×
Corrugated culinary	10	9	5	8	38	5	6	5	19	12	15	12	9	44	24	12	16	46
Totals	87	62	43	88	86	21	47	32	41	100	100	100	100	100	100	100	100	100

GRAPH VIII
Test XX, Pecos. Wares

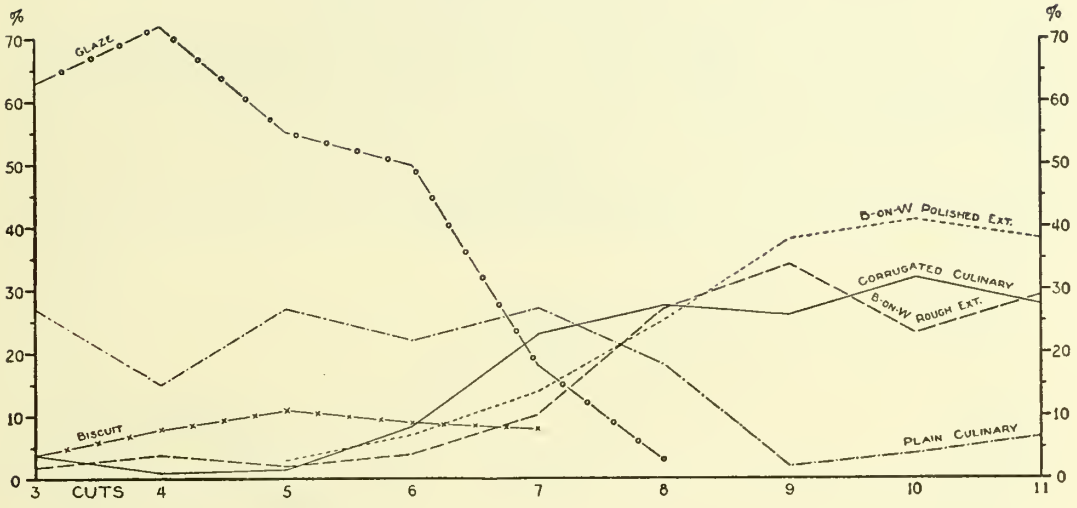


TABLE X
Test XX, Pecos Wares

	Number of Sherds									Approximate Percentages								
Cut Number...	3	4	5	6	7	8	9	10	11	3	4	5	6	7	8	9	10	11
Glaze	97	77	141	223	42	3	×	×	×	63	72	55	50	18	3	×	×	×
Biscuit	6	9	27	41	19	×	×	×	×	4	8	11	9	8	×	×	×	×
B.-on-w. polished ext.	1	×	7	30	32	24	24	18	29	×	×	3	7	14	25	38	41	38
B.-on-w. rough ext.	3	4	4	16	24	27	21	10	23	2	4	2	4	10	27	34	23	29
Plain culinary	40	16	67	96	62	18	2	2	4	27	15	27	22	27	18	2	4	5
Corrugated culinary	6	1	4	39	54	27	16	14	22	4	1	2	8	23	27	26	32	28
Totals	153	107	250	445	233	99	63	44	78	100	100	100	100	100	100	100	100	100

TEST XXI

(Depth 10 feet; surface area about 5 by 6 feet)

The test column adjoined that of Test XX on the east, and Test XIX on the west, lying between those two on an east-west line, the three test areas being not far from the southern extremity of the plaza. This test yielded more sherds than the other two combined, the great increase in number occurring principally in the higher cuts, well within the Glaze horizon, although the purely Black-on-white cuts yielded more than the corresponding cuts of the two preceding tests (see Table XI and Graph IX).

GRAPH IX

Test XXI, Pecos. Wares

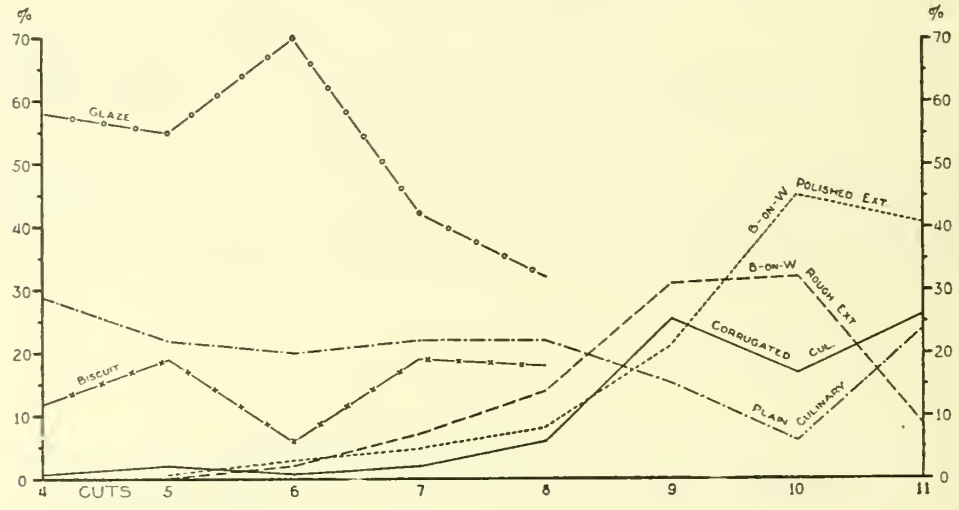


TABLE XI

Test XXI, Pecos. Wares

	Number of Sherds								Approximate Percentages							
Cut Number	4	5	6	7	8	9	10	11	4	5	6	7	8	9	10	11
Glaze	228	319	184	135	61	×	×	×	58	55	70	42	32	×	×	×
Biscuit	47	116	16	55	33	×	×	×	12	19	5	19	18	×	×	×
B.-on-w. polished ext.	×	7	9	17	15	61	66	43	×	1	3	6	8	29	45	41
B.-on-w. rough ext.	×	6	5	22	26	70	47	9	×	1	1	8	14	31	32	9
Plain Culinary	114	135	56	65	41	35	8	26	29	22	20	22	22	15	6	24
Corrugated culinary	4	10	1	7	12	58	24	27	1	2	1	3	6	25	17	26
Totals	413	593	271	301	188	224	145	105	100	100	100	100	100	100	100	100

Black-on-white ended with Cut 4 in this instance, it will be noted, Corrugated as usual lingering on. The relation of the two typical groups of the former ware remains much the same as in other tests, although the momentary dominance of the Polished, toward the bottom of the test, is more marked here.

TESTS XIX, XX, AND XXI CONSOLIDATED

The three tests consolidated comprise a single test of sizeable proportions; one which involves 4219 sherds, a surface area of 208 square feet, and a volume of 77 cubic yards. The results should accordingly be free from the inconsistencies often present in tests of lesser extent, and truly representative of conditions in the area in which the test was made. In this instance the area tested was the heart of the village throughout Black-on-white and early Glaze times, so the results obtained should

GRAPH X

Tests XIX, XX, XXI, Pecos, Combined. Wares

TABLE XII

Tests XIX, XX, XXI, Combined. Wares

	Number of Sherds								Approximate Percentages							
Cut Number.....	4	5	6	7	8	9	10	11	4	5	6	7	8	9	10	11
Glaze	337	485	456	177	64	×	×	×	60	55	57	28	21	×	×	×
Biscuit	57	143	67	74	33	×	×	×	10	16	8	12	11	×	×	×
B.-on-w. polished ext.	2	17	45	59	47	98	91	82	—	2	6	10	15	29	42	40
B.-on-w. rough ext.	8	11	25	53	58	114	71	44	2	1	3	9	19	34	33	22
Plain culinary	144	211	163	158	62	42	10	10	26	24	20	25	20	13	5	5
Corrugated culinary	14	19	48	99	44	80	43	68	2	2	6	16	14	24	20	33
Totals.....	562	886	804	620	308	334	215	204	100	100	100	100	100	100	100	100

be applicable to the site at large, in their general aspects if not in all details (see Tables XII, XIII; Graphs X, XI).

The ware graph is much smoother, the highest point attained by any line being 60, whereas in other graphs Glaze went to above 70. The general X form of the lines will be noted, the point of intersection occurring at about Cut 8. Here the wares which followed Black-on-white come in suddenly and in great strength. Glaze shoots upward while Black-on-white continues its steady downward trend. Plain Culinary dominates Corrugated, which follows its Black-on-white companions downward. Black-on-white—both Polished and Rough exterior—dwindle together, the former having a definite supremacy in the lowest three cuts. This represents the period of (relatively) good Crackle ware, which had been slowly coming into favor from earlier times, but went into a decline and decadence (Late Crackle) as its end approached. The rough exterior categories were undergoing a change, imperceptible here, as the Blue-gray ware of earlier times declined and the Biscuitoid, brown clay ware of the late phase became more popular. It may well be asked why these minor wares were

GRAPH XI

Tests XIX, XX, XXI, Pecos, Combined. Rim Form

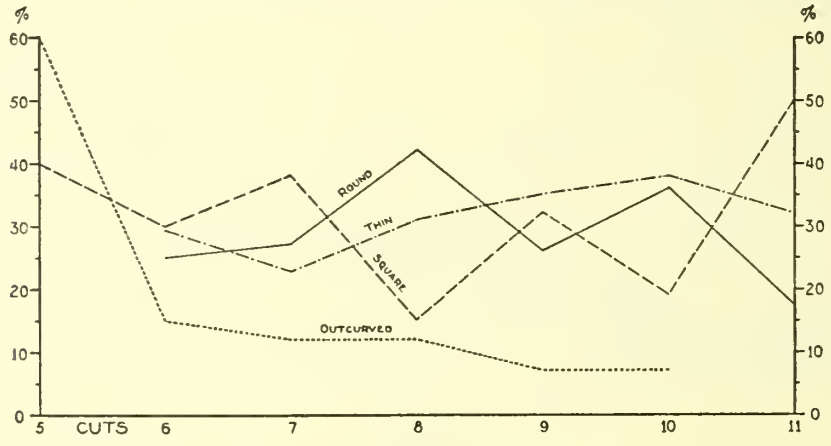


TABLE XIII

Tests XIX, XX, XXI, Combined. Rim Form

	Number of Sherds							Approximate Percentages						
Cut Number...	5	6	7	8	9	10	11	5	6	7	8	9	10	11
Square	2	7	13	4	15	8	17	40	30	38	15	32	19	50
Round	×	6	9	11	12	15	6	×	25	27	42	26	36	18
Thin	×	7	8	8	16	16	11	×	30	23	31	35	38	32
Outcurved	3	3	4	3	3	3	×	60	15	12	12	7	7	×
Totals	5	23	34	26	46	42	34	100	100	100	100	100	100	100

not shown separately, that their relationship might be demonstrated. An attempt was made to do this, but it was found that so many intermediate examples occurred that either an arbitrary judgment would be required in the case of about one in every three sherds, or an unclassified category of constantly increasing proportions would have been necessary to accommodate those frequent instances in which an honest confession of inability to classify would have looked like dodging the issue and contributing nothing to the study undertaken. The writer admits that he has left much to be explained in Pecos Black-on-white. He has saved his sanity and perhaps made a step toward clarification of the situation by adhering to fundamental differences and pointing out general trends in a ware which was in constant flux.[1]

SUMMARIZED RESULTS OF STRATIGRAPHIC TESTS

It may be said with considerable certainty that the stratigraphic tests of which the results have just been given follow the vicissitudes of Pecos Black-on-white from its earliest appearance at Forked Lightning to its final disappearance at Pecos. They embrace the entire time range of the ware; and while they do not afford ground for many definite conclusions, they give ample evidence of certain fundamental interior changes. Most striking of these is the constantly growing tendency to finish the exterior of the vessel, instead of leaving it rough (the latter having been the prevalent practice in sites as far removed from one another as Tecolote and the Greenlee ruin at Abiquiu.)

Another well demonstrated trend is toward fully developed and fashioned rims, round and square, and away from the wavering, thin rim of early times. The latter never disappears, but its importance consistently diminishes. Still another trend is the spectacular rise to favor of the outcurved rim—a rare thing in Pueblo Black-on white ware wherever found—and its absolute non-existence in earliest times. The extinction of Black-on-white by the succeeding Glaze and Biscuit wares is fully demonstrated, as is the apparently simultaneous appearance of the latter two. The gradual displacement of corrugated by plain culinary ware is seen throughout the graph series. The uninterrupted occupation of the banks of Pecos Arroyo is strongly indicated if not definitely proved by the striking correlation of the graphs of Test VI and the consolidated Pecos tests, taken in conjunction with archaeological evidence and general identity of wares, both decorated and culinary.

Basket marking, or moulding bowls in a basket, has a definite association with early times on the evidence of the tests. The two tests considered the earliest of all,

[1] Notes on Tests XIX, XX, and XXI combined.

Cut 4—Glaze 1 Yellow predominating. Little Black-on-white.

5—Glaze 1 Red predominating. Little Black-on-white.

6—Black-on-white sherds more numerous. Biscuitoid and Late Crackle predominate.

7—1 Little Colorado glaze, narrow white line outside decoration. Culinary sherds showing definite corrugation. Clay ware and Biscuitoid prominent.

8—1 Crackle sherd has Black-on-white interior, Glaze 1 Red exterior, each face typical in all respects of the respective ware; the exterior is a heavy slip, 1-16 inch thick in places.
1 Little Colorado glaze, narrow white line outside decoration.

9—1 Little Colorado glaze, broad line outside decoration.
1 Black-on-white sherd with green glaze line decoration.

Test D and Test VII, show a number of basket-marked sherds, whereas no mention of them is found in the notes of any of the later tests. Forked Lightning has yielded about two hundred basket-marked sherds; Pecos less than ten, in all excavation done. These give highly valuable data on basketry, the cast of the sherd virtually reproducing the corresponding fragment of basket[1].

But perhaps the greatest value of the series of stratigraphic tests made at both sites lies in the careful excavation, recording, and preservation, of a mass of material which embodies, without much doubt, a very full record of the ceramic beginnings of a community which stood for centuries as one of the most flourishing of the entire Pueblo culture.

THE VESSELS FROM PECOS

The excavations at Pecos, in addition to thousands of sherds, yielded ninety-six pieces of Black-on-white pottery of sufficient size or interest to warrant cataloguing as specimens. A few, perhaps 10 per cent, are unbroken vessels. Some 65 per cent may be called complete—broken when found, but most of the fragments recovered and the vessel subsequently mended. The remainder are large single sherds, or fragments made up of sherds. This large proportion of broken and incomplete pieces is not to be attributed to careless digging. The fault lay rather with the poor quality of the ware on the one hand, which rendered it easily breakable as graves were filled, or as subsequent shifting of the surrounding earth may have put the buried vessels to strain. On the other hand, the custom of burying fragments instead of whole vessels with the dead is certainly responsible for the incompleteness of many pieces recovered. This custom has been noted in Glaze as well as in Black-on-white times, and may be interpreted as beautiful symbolism or plain stinginess, as one prefers.

The collection is far from representative of Pecos valley Black-on-white ware as a whole; first because Pecos itself was the scene of only the closing phase of Black-on-white times, and second because a number of points in evidence indicate that the great majority of the fifty-eight burials which yielded these ninety-six pieces are from the very end of the Black-on-white period.[2] The relatively high percentage of vessels with burials is in itself strong evidence; for at Forked Lightning, 150 burials yielded only 4 pieces of pottery. Glaze 1, by contrast, was a period of great liberality toward the dead. Hence it is reasonable to suppose that this liberality increased as time advanced, particularly as several of the Pecos Black-on-white burials yielded two or even three vessels.

Evidence of more definite character is afforded by the finding of a Glaze I Red bowl with Black-on-white vessels in two of the fifty-eight Black-on-white graves, and Glaze I Red sherds in three of them. These five instances prove beyond question that Glaze I Red ware was being made when the burials were laid down. It is to be

[1] This materal will be presented in the volume on the specimens from Pecos (A.V.K.).

[2] It must be remembered in this connection that only a small portion of the pueblo of Pecos has been excavated —despite the fact that ten seasons were spent there. The site is large, the rubbish heaps extensive and deep, and the superposition of walls of different periods extremely complex.

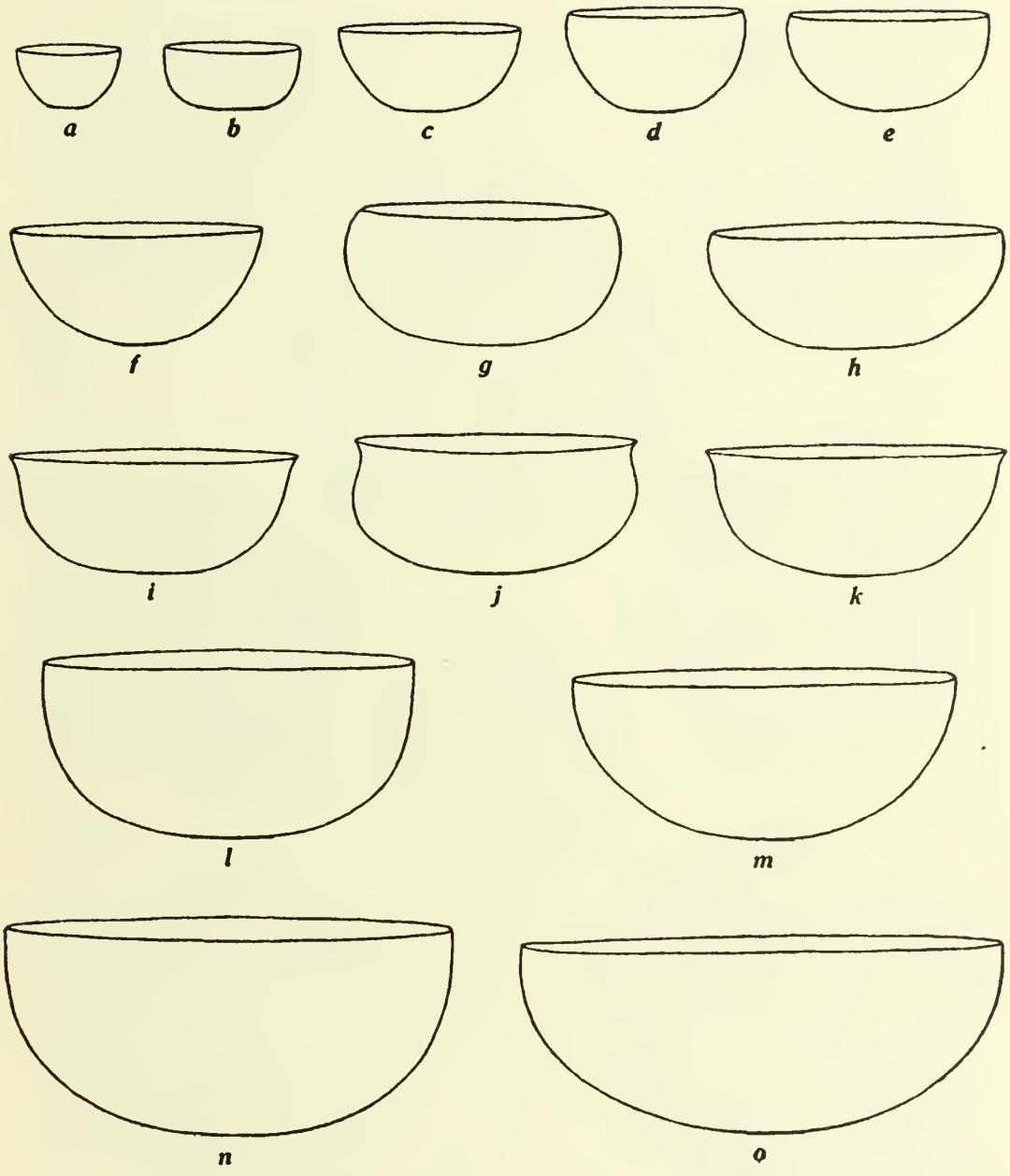


Fig. 1. Black-on-white. Bowl forms. *a-e:* Small bowls, diameters 3 to 6 inches. *f-h:* Medium sized bowls with plain rim, diameters 6 to 10 inches. *i-k:* Medium sized bowls with outcurved rim, diameters 6 to 10 inches. *l-o:* Large bowls, diameters 10 to 14 inches.

inferred that most of the other graves are not far removed from these in time, occurring as they did in the same area and on the same general level.[1]

A final point is that of eighty-three bowls in the collection, eleven show outcurved rims. This ratio, amounting to 13 per cent, is higher than that attained by outcurved rims in any of the stratigraphic tests at Pecos except in the very highest cuts. All in all, it is quite justifiable to conclude that the collection is typical of the closing phase of the Black-on-white period.

A count of the pottery types represented by the collection accords with this conclusion. It shows four specimens of Blue-gray type; two of Whitewash slip subtype; seventeen of Biscuitoid type; eight of Clay subtype, twelve of Crackle type; and forty of Late Crackle subtype. The remainder, principally small, odd forms, are not readily classifiable, some being probably intrusive, hence not subject to the Pecos ceramic classification.

Forms and Sizes

The extraordinary preponderance of bowls is brought out by the following tabulation. It is probable that in no other Black-on-white area in the entire Southwest would there be found so small a proportion of non-bowl vessel forms.

Bowl	83	Bowls 12-14 inches diameter	22
Canteen	5	Bowls 10-12 inches diameter	15
Miniature canteen	3	Bowls 8-10 inches diameter	10
Ladle	1	Bowls 6-8 inches diameter	28
Pitcher	1	Bowls 4-6 inches diameter	4
Mug (intrusive)	1	Bowls 2-4 inches diameter	2
Seed jar (intrusive?)	1	Bowl with 2 horizontal handles	1
Olla (frag.) (intrusive?)	1	Bowl with 1 vertical handle	1
Total	96	Total	83

BOWLS

It will be seen that the great majority of the bowls fall into two approximately equal size groups. If the diameter of 6 to 10 inches be taken as typical of the medium sized bowl, the total for this group is thirty-eight. Considering everything above 10 inches diameter as large, the total here is thirty-seven. Type of ware shows only a vague general correlation with size; the medium group is composed mainly of Clay and Late Crackle pieces, the large group of Late Crackle and Biscuitoid pieces.

Representative forms, drawn in silhouette, are shown in fig. 1. Fig. 2 comprises photographs of selected pieces from each type group. Decoration is considered in the next section.

A deep bowl with horizontal handles is illustrated in fig. 4, *l*, and one sherd has a complete round loop handle of the same general type, placed near the rim of the

[1] Most of the Black-on-white burials were found in the northwestern portion of the site, in two main groups: one on the northwest slope of the *mesilla*, below the escarpment; the other below the western house group in the main plaza.

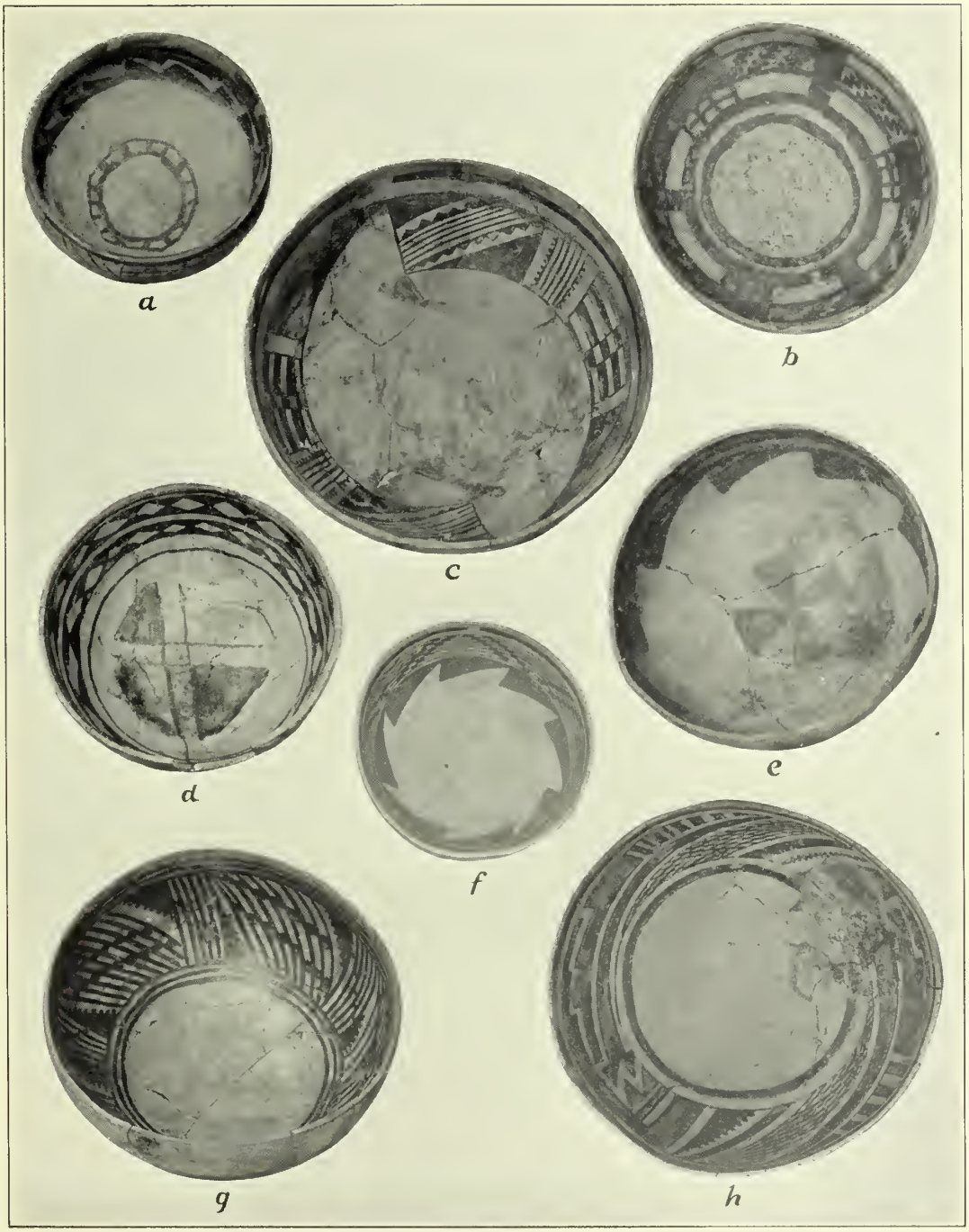


Fig. 2. Black-on-white. Mortuary bowls from the Pecos ruin. Wares represented: Blue-gray, *e;* Crackle, *d, f;* Late Crackle, *b, g, h;* Clay, *a;* Biscuitoid, *c*. Diameter of *c*, 12¼ inches; capacity 5 dry quarts (5.5 litres).

bowl on a horizontal plane. The bowl in this case was about 6 inches in diameter, and perhaps 3 or 4 inches deep. The scant fragment remaining suggests that it had almost straight sides, which would be completed, inferentially, by a broad flat bottom. The bowl with a single vertical handle (fig. 4, *k*) is apparently unique.

NON-BOWL FORMS

In dealing with most Southwestern wares, it would not be possible to dispose of the non-bowl forms in such summary fashion as grouping them all under a single head. Pecos, however, has yielded practically nothing but bowls, as is evidenced by the fact that all of the non-bowl forms worth illustrating are contained in fig. 4; and further by the fact that only eighty-three out of a selected lot of more than twelve hundred sherds from general digging are from such pieces.[1] The stratigraphic tests showed a similar paucity: fourteen non-bowl sherds in eight hundred eighty-four

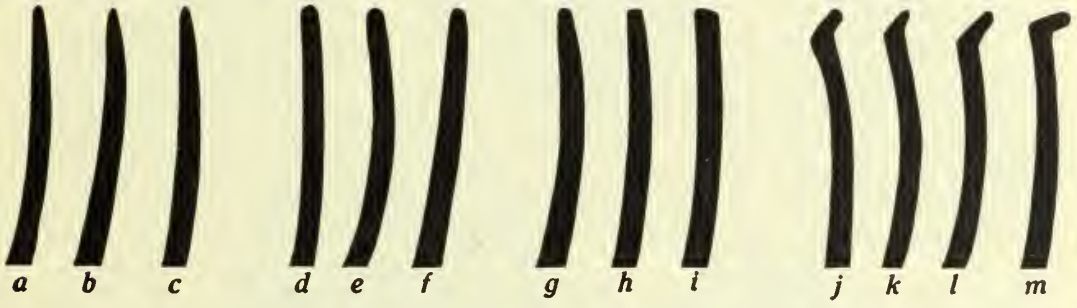


Fig. 3. Black-on-white. Bowl rim profiles. *a-c:* Thin rims characteristic of the early phase. *d-f:* Rounded rims. *g-i:* Squared rims. The rounded and squared varieties occur in about equal proportions; they are perhaps most typical of the middle phase. *j-m:* Outcurved rims; these are definitely late. Height of sections, 2½ inches.

specimens of Black-on-white ware. With such scant data little can be said of these forms. The non-bowl sherds give some indication of the relative frequency of occurrence of the different forms within this group.

Ollas seem, from the sherds, to have been in limited use. A large fragment of neck is one of the specimens in the collection from burials at Pecos. It suggests a broad, rather low and fat vessel, with a sharp incurve from shoulder to neck: a vessel which might have had a diameter of 15 inches in its broadest part, which would probably be at about the center of the body. The neck is 6½ inches in diameter, and 1½ inches high. It is straight and slightly out-flaring, with a plain rim, rounded off. The inside of the neck bears a lazily zig-zagging broad line decoration on a thin white slip. The exterior decoration followed a band pattern, evidently, but the method of division is not discernible. The specimen is not characteristic of Pecos except in form, although it came probably from the Rio Grande area.

Several olla sherds from Pecos suggest a form not unlike the one just described. Two have horizontal loop handles, one being complete. It has a gap 1 inch long and

[1] In lots selected in the field from among the great masses of sherds recovered, all odd or unusual pieces are naturally saved. Hence the percentage of fragments from non-bowl forms would be expected to be very high. Yet even in the lot under consideration it amounts to less than 7%.

¼ inch wide, that is, from handle to vessel wall. The handle itself is about ¾ inch thick, of round form, like a single thick rope of clay. A search of the literature of Rio Grande ceramics—very meager it is—shows nothing identical illustrated. The nearest approach is the Mesa Verde handled olla figured by Kidder[1]. It seems highly probable that the Mesa Verde style influenced the Rio Grande olla of Black-on-white times.

Canteens seem slightly more numberous than ollas. The illustrations (fig. 4, *f*, *g*, *h*, *j*) show them in varying shapes and with various styles of handle. The sherds add no new details, only one possessing a handle, which is of the horizontal loop type (cf. fig. 4, *g*). The neck seems usually to be short, and either straight or flaring. The decoration is prevailingly of the band type, panelled or otherwise divided.

Miniature canteens are figured in fig. 4, *a*, *b*, *e*. None is recognizable among the sherds from Pecos.

Ladles are indicated by several fragments which show them to be of the bowl-and-handle type, like the one illustrated in fig. 4, *m*.

Mugs do not occur, on the evidence of the sherds. The one illustrated in fig. 4, *d* is unique, and undoubtedly intrusive.

Seed jars are represented by one whole specimen fig. 4, *i*, suspected of being intrusive from elsewhere in the region, and two sherds which indicate a somewhat smaller vessel, perhaps of 6 inches diameter and 3 inches height, with less incurve at the top. They might be called small bowls with incurving plain rim.

The little *pitcher* (fig. 4, *c*) is apparently unique.

Decoration

In proceeding to the decoration of a vessel the artist's first decision is whether to use the bare clay or a slipped surface as a background; and if the latter, whether to use it inside, outside, or both. The Pecos potter of Black-on-white times used all three of these expedients, on different kinds of ware. The soft paste, Rough Exterior category (Blue-gray type) most characteristic of early Black-on-white almost never has an exterior slip, and frequently it has, to all appearances, no interior slip. The light blue or gray-green native color affords sufficient contrast to the dark, bluish paint to render a slip unnecessary. The Clay ware category of late times is likewise unslipped, and the deep black paint of the decoration shows upon its brownish surface very effectively. The Polished Exterior, hard paste category (Crackle type) has an exterior slip as does an intermediate category, numerically very small and in general late chronologically, which has a thin white slip inside and out, usually without exterior polish.

Zone of Decoration

The question of background color disposed of, the next to arise is choice of the area to be decorated, or zone of decoration. Form of the vessel of course affects this question, but as the bowl is the outstanding form at Pecos, it alone will be considered in this general discussion. The bowl offers three principal decorative zones: exterior wall, interior wall, and interior bottom. The rim, especially of outcurved rim vessels,

[1]1924, fig. 9, g; pl. 27, a.

Fig. 4. Black-on-white. Non-bowl forms and handled bowl. With the exception of two fragmentary pieces this is the entire collection of such vessels from Pecos. Wares represented: Blue-gray, *b*, *k*; Crackle, *m*; Late Crackle, *a*, *c e*, *l*; Clay, *f*, *g*; Intrusive, *d*, *h*, *i*, *j*. Diameter of *g*, 8 inches.

is a minor decorative zone, so limited in area however that its decorative potentialities are small. The two interior zones, wall and bottom, may be combined in one and this is sometimes done with all-over or segmented patterns. The exterior bottom is of small use as a decorative zone, being generally invisible, and subject to constant wear, which would soon destroy the design.

The problem at Pecos is simplified at the outset by the virtual elimination of the exterior wall zone. A count of over two thousand decorated sherds from Forked Lightning showed only fourteen with outside decoration, or 0.7%. At Pecos the percentage is higher, yet still very small—thirty-four of eleven hundred sherds, or 3.1%.[1] Outside decoration occurs usually on small bowls with outcurved rim, being particularly associated with the intermediate category with white interior and exterior slip. It is at first surprising to find so little outside decoration in Pecos Black-on-white when one considers the strong decorative resemblance of this ware to that of the northern San Juan, in which outside decoration becomes in late times a very common feature. This apparent anomaly is probably explicable on the ground that the San Juan influence at Pecos is of earlier date than the development of outside decoration as a characteristic feature of northern San Juan ware.

The interior of the bowl was the favorite decorative field of the Pecos potter, and of this field she showed strong preference for the wall as the zone of decoration, although she also made occasional use of the whole field. Patterns in which the wall is the zone of decoration fall into two classes, one of which is very minor and of late occurrence. For these reasons, and because it is not typical of Black-on-white decoration, it will be considered last.

BAND PATTERNS

Throughout Pecos Black-on-white, the band is the favorite pattern. Its width is proportioned to the depth of the bowl, but it usually covers the entire wall, beginning a little below the rim (space being left for one or more upper framing lines) and ending where the wall merges into the bottom of the vessel, so that the lowermost framing line is often on the bottom rather than on the wall of the bowl. Band patterns are of two main types, the continuous and the divided.

CONTINUOUS BAND PATTERNS This type of pattern is distinctly the simpler of the two, although not the one most preferred by the ambitious potters of Pecos.

Line patterns. The most elemental form is a series of parallel lines encircling the vessel. Monotony is usually avoided by interpolated blocks or dots in rectangular or zig-zag arrangement (fig. 5, *d*, *f*, *g*, *j*), or by a series of triangles in solid color pendent from the lower encircling line (fig. 5, *a*, *c*, *d*, etc.). Frequently both devices are used. It is not unusual to find a single isolated figure, usually a conventional bird, a Maltese cross or an hour-glass form (which is one-half of a Maltese cross), centered in the bottom of the bowl which carries this type of pattern, as shown in fig. 5, *c*, *e*, *h*, *j'*. Representation of the bird is a late development in Pecos Black-on-white. The earlier phases of the ware follow quite uniformly the rectilinear geometric style which is so marked a trait in Black-on-white times everywhere, except in the Mimbres region. It will be noted that two of the patterns illustrated in fig. 5 (*f* and *j*)

[1] Probably due to selection in the field; the Forked Lightning sample was an unselected collection.

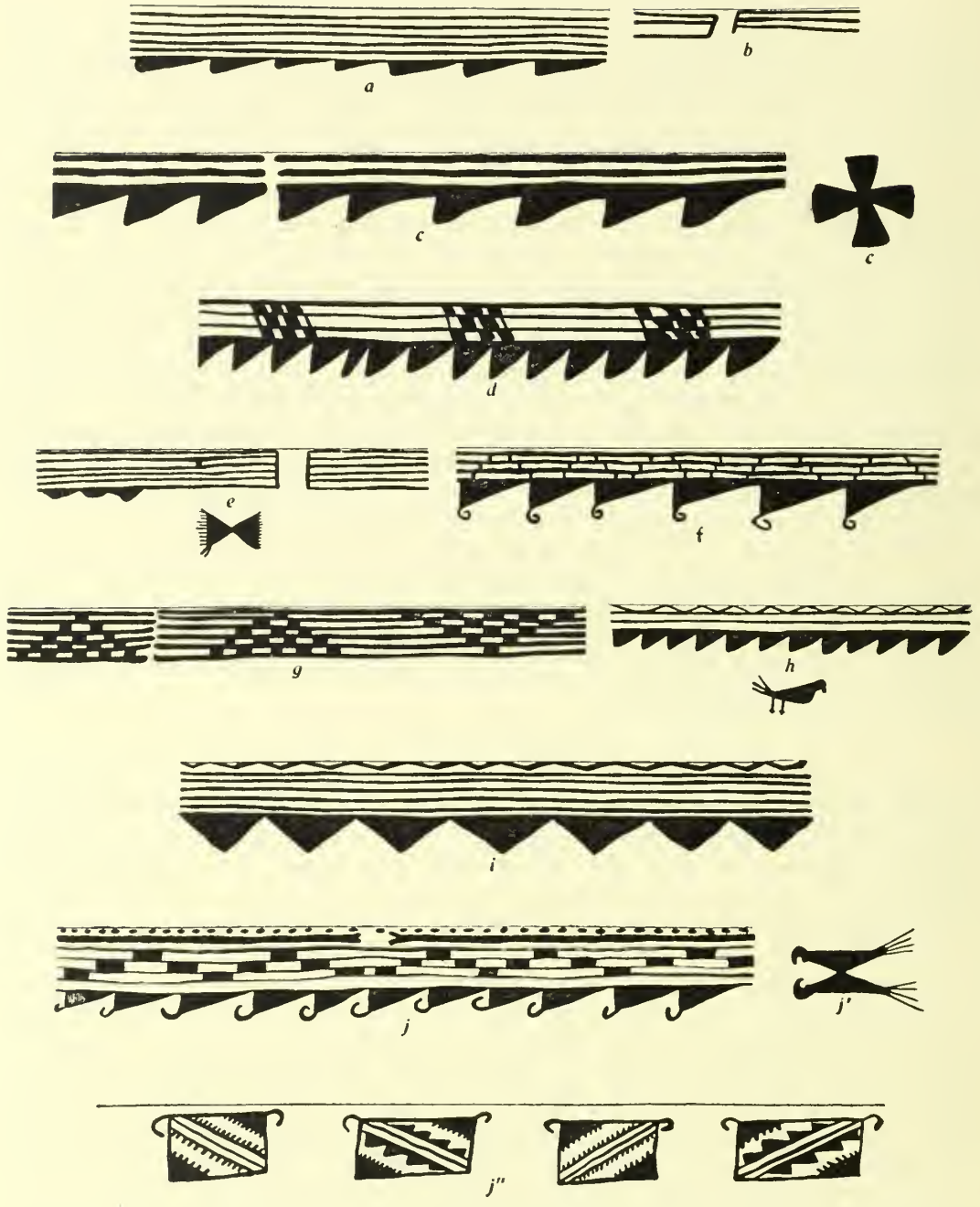


Fig. 5. Black-on-white. Continuous band patterns, parallel lines and pendent triangles. The figures standing at the end of, or just below, the designs occur in the bottom of the bowl. The zig-zag and dotted upper lines of *h*, *i*, *j* are decorations on the outcurving rim. The four panels of *j''* are exterior decoration. Wares represented: Blue-gray, *c*, *h*; Crackle, *e*; Late Crackle, *b*, *d*, *f*, *g*, *j*; Biscuitoid, *i*; Clay, *a*. About one-third natural size.

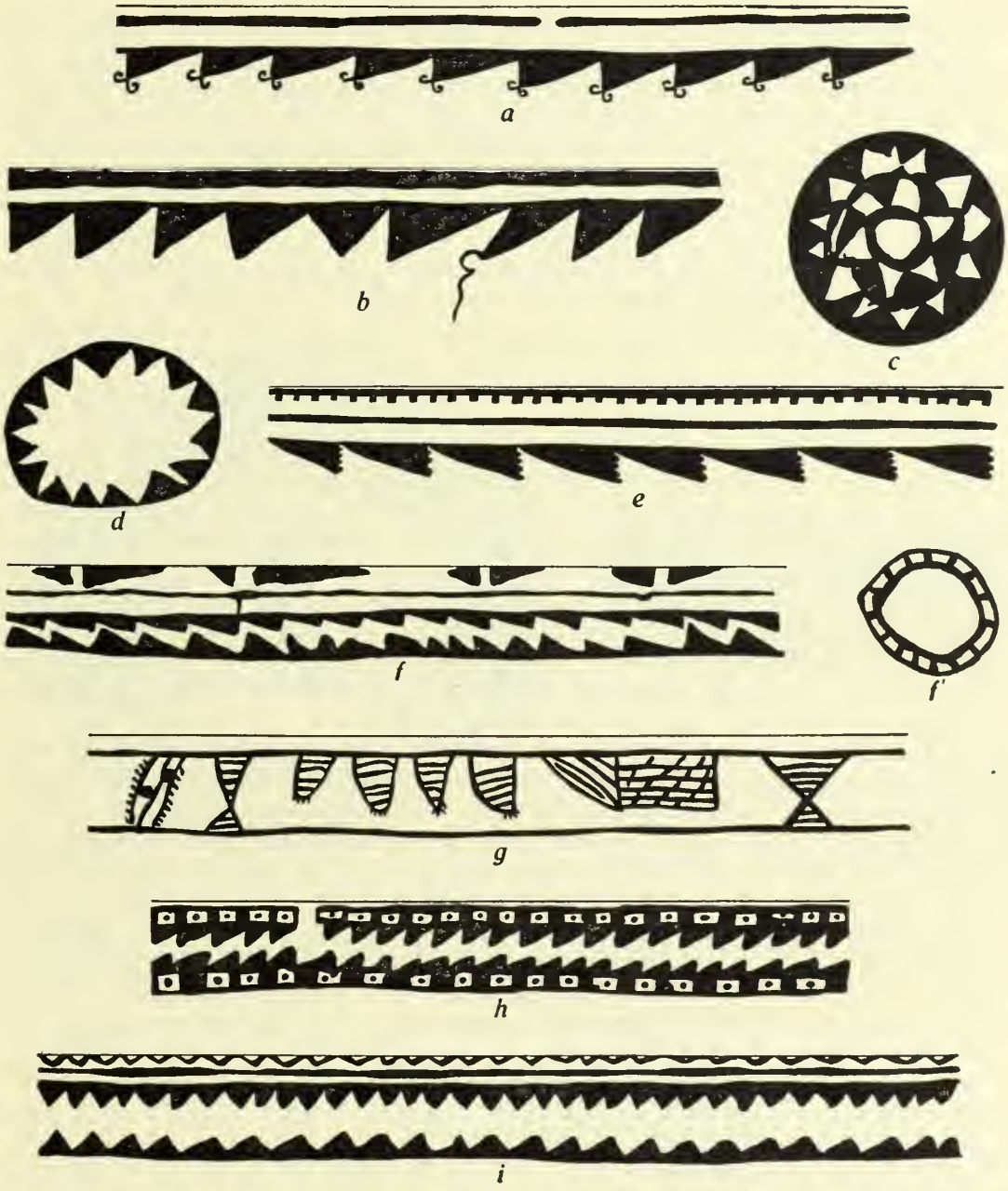


Fig. 6. Black-on-white. Continuous band patterns, pendent and opposed triangles. The pattern at *c* is from the interior of a small bowl; that at *d* from a ladle; the circular figure at *f'* is from the interior bottom of the same bowl that carries the pattern to the left; *g* is the exterior decoration of the same bowl. Wares represented: Blue-gray, *d;* Crackle, *e, i;* Late Crackle, *b, h;* Biscuitoid, *c, f, g;* Clay, *a.* About one-third natural size.

have a crook-like flourish at the apex of each pendent triangle that is very suggestive of the head of a bird as it occurs in its most simple and conventional form (see fig. 18 for illustrations of the bird in Pecos Black-on-white). The triangle is itself suggestive of the bird body, which is frequently represented in this rectilinear form. Looking far ahead to Glaze III and IV times in which a highly conventionalized bird is a common decorative figure, not alone at Pecos but throughout the Rio Grande region[1], this first appearance of the bird is of unusual interest. The earlier Glazes and Biscuit ware[2] have their bird forms as well, forming an unbroken sequence from Black-on-white times onward; although it is not meant to imply that the bird of Black-on-white times is necessarily the graphic forbear of the others.

Opposed Triangle Patterns. The series of triangles attached to a common base line is a decorative device of many possibilities. It has just been considered in its simplest form, that of pendent triangles. The addition to this design of an identical row upthrust instead of hanging, with the apexes pointed toward one another, constitutes an important variant of this motive in Pecos Black-on-white. Examples are shown in fig. 6, *f*, *h*, *i*. A negative space of lozenge or diamond shape is a by-product of this design, and in the simpler examples, as those of fig. 6, *f*, *h*, it obviously is not considered decoratively by the artist. The points of the triangles do not fall symmetrically opposite one another, and this negative space has little aesthetic value in consequence. It is quite evident that the painter has occupied herself largely with the creation of her two series, each in its turn, without any apparent concern for their composite effect. The pattern in this form may be considered a mere doubling of the pendent triangle motive, except that the triangles are opposed instead of being pendent in each series, as they are in fig. 6, *c*.

A final category of patterns based upon the opposed triangle motive is illustrated in fig. 7: *b*, a mug, is beyond all reasonable doubt an intrusive piece from the San Juan region (for photograph see fig. 4, *d*). The other two specimens (fig. 7, *a*, *c*) are bowls, both of that highly polished, softly lustrous ware, polished inside and out, with crackly slip and paint which merges slightly into the background. They might have been made at Pecos, but it is quite conceivable that they too came from the San Juan region. However that may be, their common trait is a pattern in which the opposed triangle motive is strongly suggested. The triangles meet and merge somewhat at the apex, emphasizing the negative factor through giving it precise form. In one case, fig. 7, *c*, these produced blank spaces have definitely been recognized by dotting.

The analogy of this pattern to the foregoing should not be too strongly emphasized; perhaps, for one reason, instead of drawing individual triangles, as in the patterns previously described, the decorator here draws criss-cross lines between upper and lower banding lines, producing triangles instead of rectangles by making one set of cross-lines oblique rather than horizontal and filling alternate spaces in solid color. The technique is really that of checkerboarding, but it produces opposed triangles just as surely and effectively as the other method. The visual

[1] See Kidder, 1915, pls. XXIV and XXVIII.
[2] See figs. 48, 82.

effect of the two techniques is so similar that, given their contemporaneity, it is easy to believe that they are expressions of the same decorative idea.

Repeated Figure Patterns. This category, examples of which are shown in fig. 8, *g-k*, consists in the repeated alternation of figures which are free-standing except for their common dependence upon a base line, which in most instances is the banding line itself. All of them happen in this figure to be either keys or terraces. The terrace may have originated as two keys placed back to back instead of face to face, as they usually occur.

The four repeated figure band patterns illustrated in fig. 8, *h-k*, offer an interesting series of single and double terrace figures: single in *i* and *k*, doubled but not

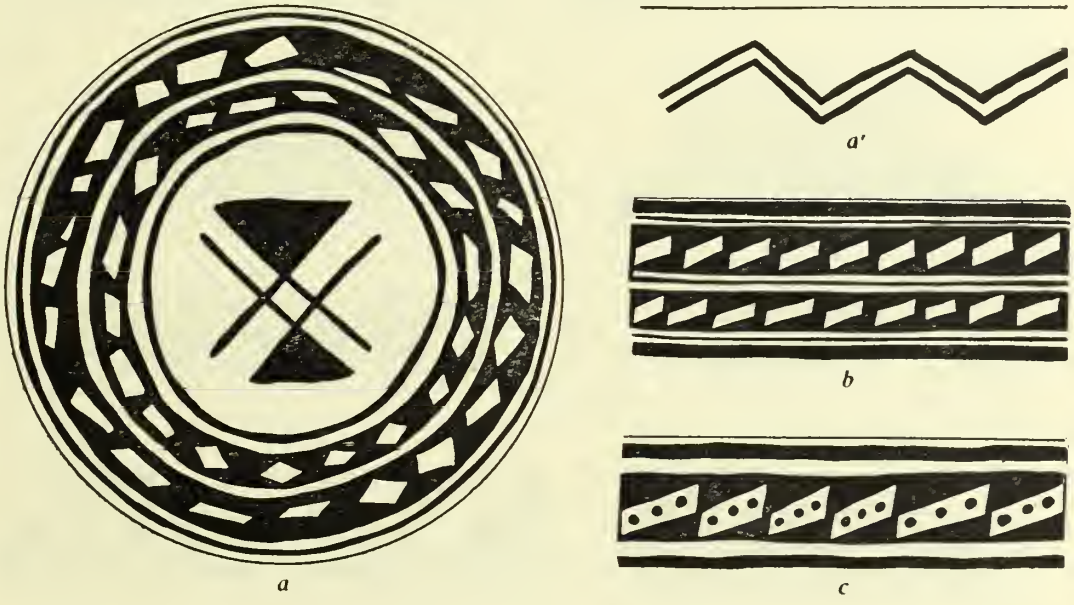


Fig. 7. Black-on-white. Continuous band patterns, opposed triangles joined. The zig-zag at *a* (upper right) is the exterior design of *a*; *b* is from a mug of San Juan type; *c* from a small bowl. Wares represented: Crackle, *a*, *c*; San Juan, (?), *b*. About one-third natural size.

consolidated in *h*, consolidated in *j*. If, as has been suggested, the double terrace was in fact derived from the key, every step in the process is here represented.

Fig. 8, *i* is of interest in that it has the pendent triangle motive at its base, and still more so for the break which occurs in the lower banding and framing lines. This is the only instance observed in which a break occurs at the bottom of a pattern only. It will be seen that the top framing line and banding line are both unbroken. This break was deliberately made, beyond question, for instead of leaving free ends the decorator has joined the banding and framing lines on either side of the opening.

DIVIDED BAND PATTERNS. It should perhaps have been pointed out earlier in this study that band patterns which may be termed enclosed, i.e. bounded above and below by banding lines, denote a great change in decorative concept from that

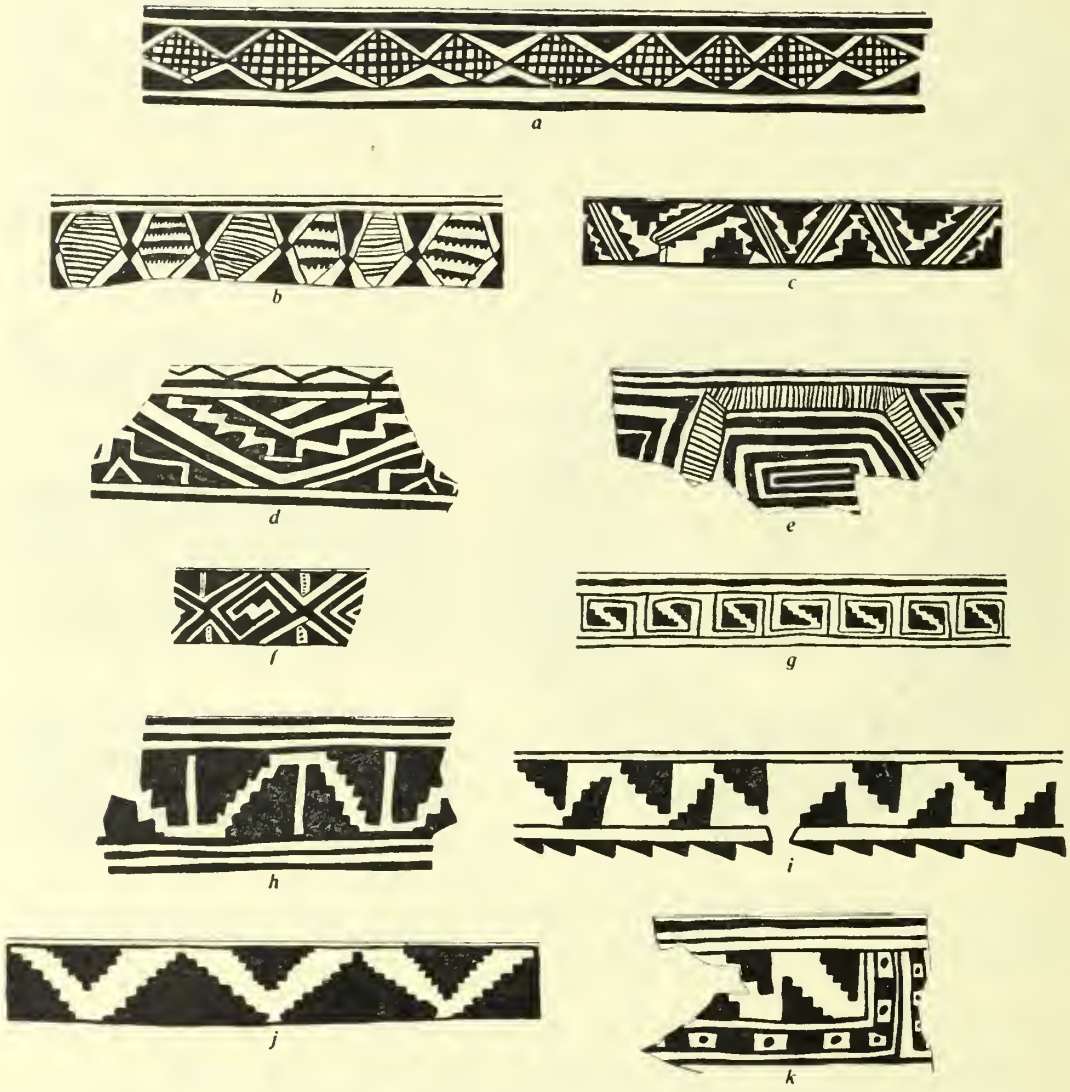


Fig. 8. Black-on-white. Zig-zag or triangular band division and repeated figures. *c*, *d:* Single zig-zag division producing triangular fields. *a*, *b*, *f:* Double zig-zag division producing diamond-shaped fields. *g-k:* Repeated figures (keys and terraces), *k* is apparently from a panelled band. Wares represented: all Late Crackle except *c*, which is Biscuitoid. About one-third natural size.

of the parallel line and pendent triangle categories. These latter are patterns in which the line is paramount. Either it constitutes the decorative pattern, as in the case of simple parallel lines, or it forms a definite base upon which further elaboration is grounded, as in the case of the pendent triangles and the interposed dots and blocks in fig. 5.

Those simple pattern types offer problems of line; but the moment the decorator draws two parallel encircling lines to fix the upper and lower limits of her pattern, she has set herself a new and more difficult problem—one of space. Formerly she had but one line to consider, and could work outward from it as freely as she pleased. Now she has two lines to reckon with, and must work inward from them both to achieve an even and harmonious division of the space which they enclose.[1] Naturally enough, her first concern is to subdivide this space into smaller areas; areas which the eye (which alone guides her brush) can easily visualize, and the intellect can fit with a design. Obviously, the smaller the area the less the mental effort required to fill it.

Zig-zag or triangular division. Triangular or zig-zag subdivision of the band is illustrated in fig. 8, *a-f*. This is the first group of patterns to be considered in which deliberate subdivision of the banded area is a process in preliminary layout, before actual graphic decoration is begun. Guthe makes it clear that the modern potters of San Ildefonso subdivide their bands into panels (when as is usually the case, a paneled pattern is decided upon) before they begin the business of drawing their designs[2]. An examination of Pecos bowls indicates that the potters of Black-on-white times followed this same sound practice, for their subdividing lines often overlap the previously drawn banding lines, and are themselves frequently overlapped by the lines of the design.

Triangular subdivision is accomplished by means of oblique lines drawn from lower to upper banding line, or vice versa. A single zig-zag series divides the band into isosceles triangles. A double series, the lines of the second intersecting the lines of the first at mid-point, divides the band into diamonds, with isosceles triangles of smaller area as by-products, as it were. Fig. 8, *c* and *d* illustrate division by a single zig-zag; *a*, *b* and *f*, by a double zig-zag series. Division of space accomplished, it remains to fill the area created. This is done simply enough in the examples illustrated. Hatching is employed in two cases (*a* and *b*); opposed keys in one (*f*); and opposed dentate figures, the most common decorative device in the entire range of Pecos Black-on-white, in the remaining two cases (*c* and *d*). A change of rhythm will be observed in *b*. Instead of the repetition of *a*, (which may be expressed as A A A), there is alternation of design (A B, A B). This alternation is common in the paneled band patterns, next to be considered.

Paneled Band division. This is the largest category of pattern types in Pecos Black-on-white, and the one in which the oft-repeated motive of dual opposed stepped or dentate figures occurs most frequently. It may therefore be said to be the nearest approach to a typical local pattern, occurring in all types of ware from

[1] It might be argued with some plausibility that the earliest Southwestern pottery decorations are linear rather than spatial in concept. See Roberts, 1929, pls. 14, 15, and 16; and Kidder, 1924, p. 111 fig. 21.

[2] 1925, p. 78.

early to late times. If any chronological modification is noticeable in the scant material available for the study of design, it is the gradual abandonment of the hatched in favor of the solid stepped or dentate figure. The opposition of hatched and solid figures is more apparent in the earlier than in the late examples of this ceramic group.

The paneled band pattern in its most characteristic form is produced very logically and simply: a primary division is made by means of vertical lines which cut the band into panels (fig. 9, *a*); and a secondary division by oblique lines cutting off opposite corners of each panel, which is thus broken up into three small areas (fig. 9, *b; c* shows the areas filled with decoration). The outer areas, which comprise the corners of the panel, are right-triangular; the central area is rhomboidal, although frequently so small in extent as to be a mere negative strip, suitable only for such compact decoration as parallel lines or dots, as in fig. 10 *c*, *d*, *h* and fig. 11, *d*.

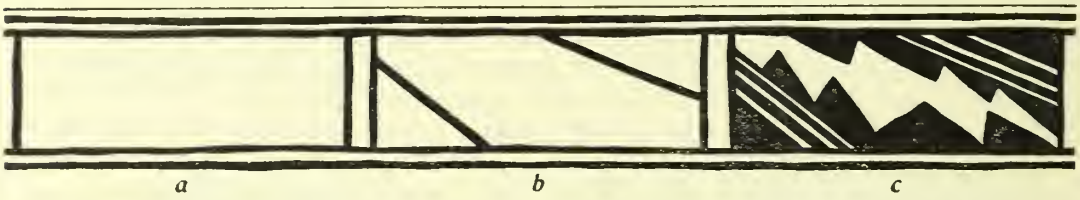


Fig. 9. Black-on-white. Panel division. *a:* The panel produced by drawing vertical paneling lines between the banding lines. *b;* The panel subdivided by oblique lines. *c:* The design completed. Diagram.

These three areas are treated each in turn by the decorator, and the panel is complete. The next panel decorated may be identical in layout but different in treatment, identical in both, or different in both. As between alternation and repetition of panel designs, the material under study shows these two occurring in about equal proportion. Alternation requires an even number of panels within the band, usually four. Repetition occurs in both threes and fours. Four seems a shade the more popular, as might be expected, for it makes easier the equal division of band areas; the four vertical lines which create the panels can be drawn opposite one another—a feat of eye rather than of calculation. Anyone who has cut a pie will appreciate the problem involved.

Interior treatment of the paneled band pattern is less stereotyped than subdivision of the area, but the paired opposed stepped or dentate figure—key, triangle, or simply a jagged line—solves the problem in many instances, as shown in fig. 10, *b*, *d*, *g*. In others, parallel lines, either plain or ticked, or simple triangles solidly colored, are employed. Alternating panels in a series are frequently treated horizontally instead of obliquely, as shown in fig. 10, *d* and *e*. Fig. 10, *a* shows an interesting combination of oblique division and stepped treatment in that the oblique dividing line is a stepped instead of a straight line. In that instance the layout virtually fixed the design, for the decorator had only to hatch the central area by way of contrast to the two solid-colored outer areas, and a very pleasing design was the result.

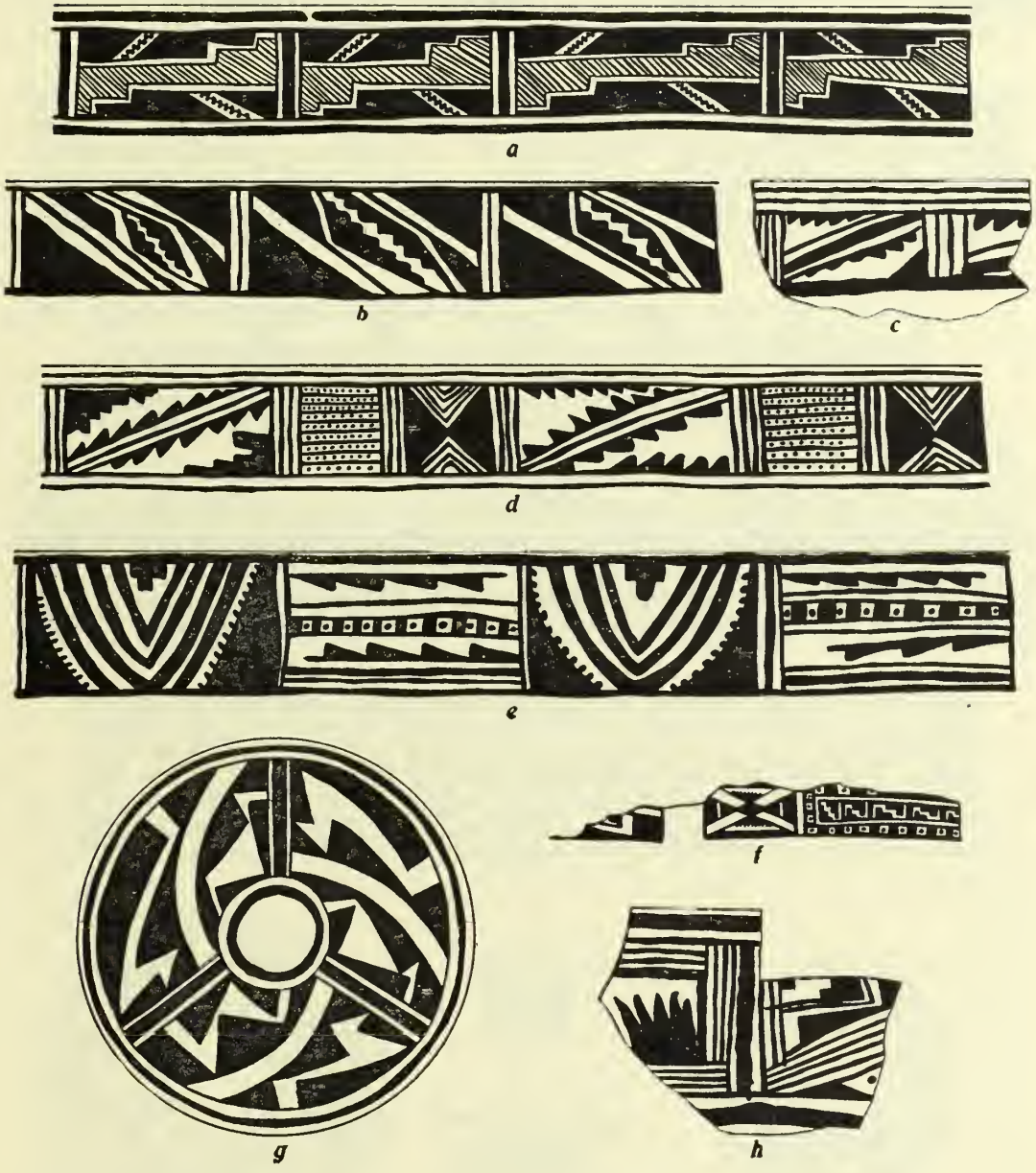


Fig. 10. Black-on-white. Paneled band patterns. Wares represented: Late Crackle, *a-e*, *h*; Biscuitoid, *f*, *g*. About one-third natural size.

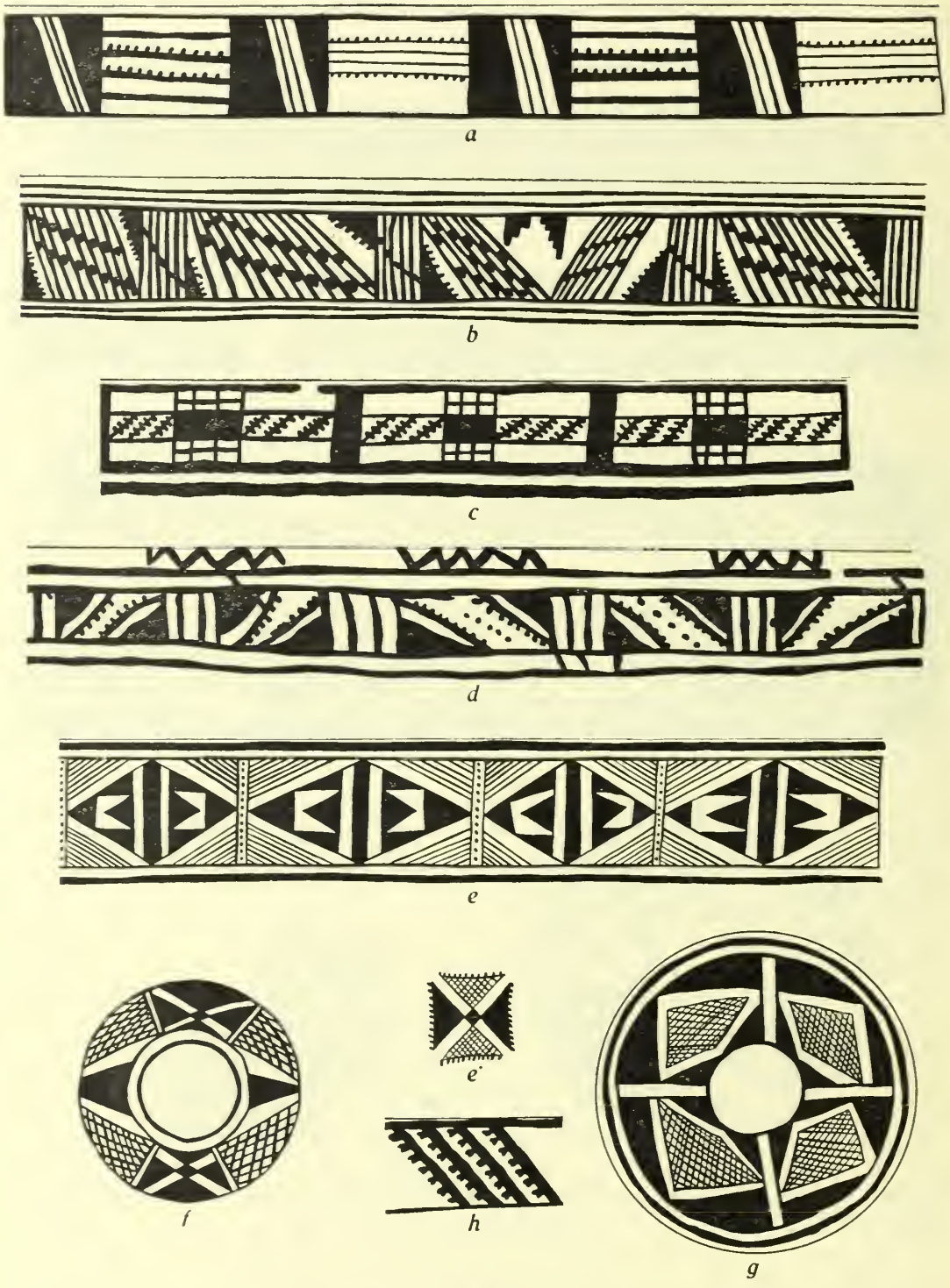


Fig. 11. Black-on-white. Paneled band patterns. The Maltese cross at lower *e* is the interior bottom decoration of upper *e*. The pattern at *f* is from a canteen (see fig. 4, *g*); *h* is a section of the exterior decoration of the vessel illustrated in fig. 12. Wares represented: Late Crackle, *b-e, g, h;* Biscuitoid, *a;* Clay, *f*. About one-third natural size.

Fig. 10, *h* is only a fragment of a large bowl, but it reveals a treatment rarely found in Black-on-white, although common in Biscuit ware. The upper right corner, the rim section of which is missing, shows that the triangle formed by oblique panel division was further subdivided into a rectangular figure by cutting off the right angle of the corner with a corresponding right angle to complete the rectangle, which was then filled with a pair of opposed keys.

An expedient for panel alternation not uncommon in Pecos Black-on-white is shown in fig. 10, *d*, in which two half-size panels comprise the alternate to the one of full size, the rhythm being A B B′, A B B′. In this same example will be observed the dotted line, of frequent occurrence locally, while *e* and *f* of this same figure show another characteristic local feature, particularly of late times—the dotted checkerboard strip.

Fig. 10, *e* has the A panel in the alternate series subdivided in a variant of the oblique mode; the division is oblique, but cuts off the two lower corners of the panel, instead of the diagonally opposite corners.

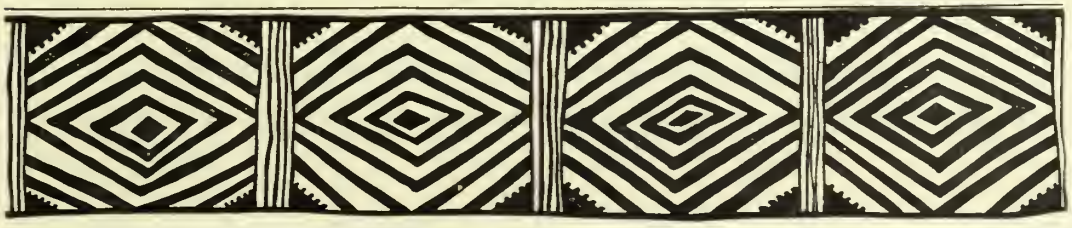


Fig. 12. Black-on-white. Paneled band pattern from Late Crackle bowl. About one-third natural size.

Oblique panel subdivision occurs in yet another form, examples of which are shown in fig. 11, *e*, *g* and fig. 12. Here the division by oblique lines is doubled, cutting off every one of the four corners of the panel to leave a large central area of diamond shape, and four small right-angled triangles in the corners. Intensive treatment differs in each instance illustrated. In *e* it is by vertical division and horizontal subdivision of the central diamond into solid triangles, with the corner triangles hatched. In *g* it is by cross-hatching of the diamond, corner triangles being solid. In fig. 12 it is by boxing the entire area down to a very small solid central diamond. This sort of panel subdivision bears a factitious resemblance to the double zig-zag division described on page 55 of which examples are shown in fig. 8. Structurally, however, they have nothing in common, as a comparison of the description of the structure of each will prove. There is analogy with zig-zag division in fig. 10, *f* and fig. 11, *f*, however, in which division of the panel is by oblique lines crossing at midpoint, the lines being doubled in each instance to give the familiar Maltese Cross figure so frequently seen in Black-on-white pottery throughout the northern San Juan area.

Oblique division by cutting off the two lower corners of the panel is seen in fig. 11, *b* (third panel from the left) and *f* (cross-hatched panels). Thus five forms of oblique panel division have been found in the examples illustrated in figs. 10 and 11:

(1) cutting off opposite upper and lower corners (fig. 13, *a*); (2) lower corners only (fig. 13, *b*); (3) all four corners (fig. 13, *c*); (4, 5); division by an X, or double diagonal bisection of the panel, with either (4) single (fig. 13, *d*) or (5) double lines (fig. 13, *e*).

Fig. 11, *a* brings a new type of panel division, by horizontal rather than oblique lines. The decorator seemingly lacked the imagination to pursue this form farther than its bare framework, contenting herself with dotting certain lines to produce a very meager and unsatisfying design. The smaller panels of this example show a form of oblique division and a decoration quite as simple as that of their alternates. The peculiar rhythm of this pattern will be noted; A B, A C, A B, A C. In the example just below it is stranger still, being A A B A; but one suspects this to be an instance of blundering rather than originality seeking expression.

Fig. 11, *c* is a curious and not unsuccessful combination of paneling with current band decoration. It is really a paneled pattern, however, for close examination of the

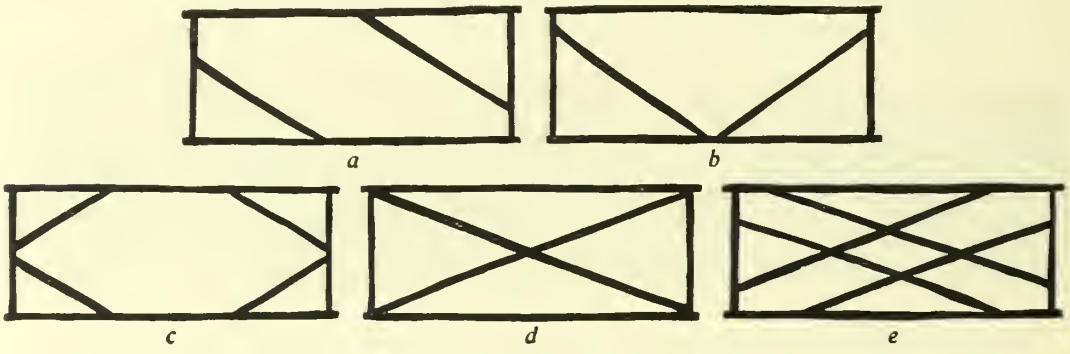


Fig. 13. Black-on-white. Methods of oblique panel subdivision. *a:* Opposite upper and lower corners. *b:* Lower corners. *c:* All four corners. *d:* Single-line X. *e:* Double-line X. Diagram.

bowl itself shows the design to have been constructed in the following manner: first, banding lines; next, the heavy paneling lines; then the horizontal centre strip, and finally the vertical cross-hatched figure which completes the pattern. The broken banding line of this example and the broken framing line in *d* will be noted.

ALL-OVER PATTERNS

The pattern types thus far considered have been of the banded category, in which the decorative area consists of a rectangular subdivision of a circular field, deliberately created by the decorator to simplify the problem of graphic treatment of her vessel. This category embraces the great majority of Pecos Black-on-white bowls, its principal subsidiary type being the paneled band pattern.

Another important group of patterns is the all-over category, in which the decorative area is the whole field of the vessel, exterior in the case of non-bowl forms, interior in the case of bowls.[1]

[1]The banded pattern of course can, and often does, embrace virtually the whole available area, particularly in the case of mugs and small non-bowl forms generally. It is none the less a deliberate creation of the decorator for structural purposes.

FIGURE PATTERNS. The all-over field, like the band, can be treated as a unit or subdivided. In fig. 14, *b* and *c* it is treated as a unit, the decorative figures being placed within it in a posture and position determined by consideration of the whole area, not, as in the case of divided patterns, by consideration of an artificially created sub-area.

Harmonious relation of one figure to another, and of each to the whole pattern here becomes a paramount factor. In the pattern of two *awanyu*-like figures in fig. 14, *c* this has been achieved very successfully[1]. The zoomorphic triangular figures of fig. 14, *b* form a much less successful pattern[2]. Each of these pieces seems, on the evidence of the sherds, to be unique in Pecos Black-on-white.

QUADRATE OR QUARTERED PATTERNS. This group, illustrated in fig. 14, *d*, *e*, and *g*, is characterized by a division of the whole field into four equal parts, *e* being a perfect example; division in this case was by two lines, sweeping across the entire field to form an X. The result was four equal right isosceles triangles (see fig. 15, *a*). Bent key-stalks pendent from the sides of the triangles subdivide them into three sub-areas which are filled with the well-known combination of dual opposed key figures. Thus this apparently complex pattern is nothing more than progressive downward division of area: primary division into four, secondary division into three, final filling with two opposed keys. This large bowl is perhaps instrusive from elsewhere in the Rio Grande area. Neither ware nor pattern is quite typical of Pecos, and the piece has a hump or rounded rise in its bottom which is not characteristic of local bowls.

Another form of quadrate division has, for want of a better term, been called offset quadrate.[3] Examples are shown in fig. 14, *d* and *g*. Primary division in this pattern is by means of four lines drawn from or to points equidistant on the bowl's rim. Each line avoids bottom center, by which means a negative rectangle is produced therein (see fig. 15, *b*). This layout requires a nicety of calculation unequaled by anything heretofore considered. Perhaps for that reason, the pattern is very rare at Pecos. The area produced is of right triangular form. In *g* it has been treated in the favorite motive of dual opposed dentate figures, one hatched, the other solid. In the second example, *d*, the treatment follows the suggestion of the primary dividing line, consisting of lines and strips which parallel it outward to the rim, with a solid triangle, ticked along its base, to complete the design.

SEGMENT PATTERNS. Segment division is illustrated in fig. 14, *f* and *h*, and fig. 15, *c*, *d*). It consists in drawing two parallel lines across the central portion of the bowl, from rim to rim (or rim line, more properly speaking). On a plane surface these two lines would be chords, and the portion of the rim line which they isolate would be an arc. The curved surface of a bowl is not a plane surface, however, (although treated as such, insofar as possible, by the decorator), so the area thus set off is

[1] Like the bird, the *awanyu* becomes an important decorative feature in later Rio Grande wares (see pp. 118-125 below).

[2] Jeancon, 1923, p. 51, fig. 12, f, illustrates a "fish", which occurs apparently in Biscuit ware, and is identical in smallest detail with the figures of fig. 14, *b*.

[3] Holmes (1886, page 323) calls this a cruciform arrangement, but the implication is misleading, since the structural lines of the pattern do not cross; they merely meet.

Fig. 14. Black-on-white. All-over patterns. *a:* Unclassifiable; Pecos decoration at its worst. *b, c:* Figure patterns. *d, g:* Offset quadrate division. *e:* Quadrate division. *f, h:* Segment division; the pattern of *h* is incomplete, the outer part of the bowl having been cut away. Wares represented: Blue-gray, *e;* Crackle, *d;* Late Crackle, *a, b, c, h;* Biscuitoid, *f, g.* About one-third natural size.

difficult to characterize. But it is bounded by straight lines, hence can be treated in rectilinear geometric form if the decorator wishes.

The two examples available of this pattern are unfortunately both fragmentary, so their treatment cannot be determined with certainty. The method of subdivision of *f* is doubtful; a possible reconstruction is given in fig. 15, *c*. The negative space between the two parallel lines of primary division was subdivided into panels, probably alternately negative and decorated. The only one visible of the latter has the familiar oblique parallel division by cutting off diagonally opposed corners.

Figure 14, *h* appears complete but is only the lower portion of a bowl which has lost its upper wall area. The edge is ground smooth, indicating that the piece was put back into service after the accident. Subdivision of each segment appears to have been by curved lines—a great rarity at Pecos—thus producing two areas of about equal size (see fig. 15, *d*). The two areas were treated with respectively two, three, and four parallel pairs of opposed dentate figures, the variation in number being apparently due to miscalculation of space in laying out the area to be filled.

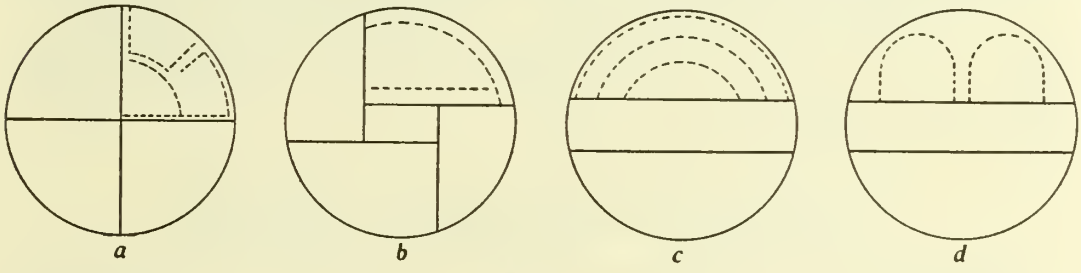


Fig. 15. Black-on-white. All-over decoration. Methods of primary (solid line) and secondary (broken line) subdivision of the bowl's inner surface. *a:* Quadrate (cf. fig. 14, *e*). *b:* Offset quadrate (cf. fig. 14, *g*). *c, d:* Segment divisions with curvilinear secondary treatments (cf. fig. 14, *f, h*). Diagram.

The remaining area of the segment shows something akin to the Maltese Cross in the small portion of the base which is visible.

Careful examination of the illustration will show how greatly the decorator was embarrassed by the curved lines she drew in a moment of folly. Straight lines would have done as well, producing triangular areas which could have been filled with design much more neatly than could the curved spaces she imposed on herself. The central strip across the bowl is paneled, the panels being treated in the familiar oblique division method, with traingles in the corners and dual opposed dentate figures in the middle space.

PENDENT TRIANGLE PATTERNS

This type of pattern consists in the enlargement and lengthening of the triangle which figures so strongly in the paneled patterns of Black-on-white ware, making of it a framework for a sub-pattern having all the graphic possibilities of the band pattern itself. The triangle is pendent from a line beneath the rim, and occurs singly or in groups of two or three to encircle the vessel. Examples are shown in fig. 16, *c* and *d*. Fig. 16, *a* and *b* are modifications of this pattern, being more of the banded

type, and suggesting the derivation of the pendent triangle pattern from that type. Simple hatched triangles are shown in fig. 16, *g*, *h*, *i* and *j*. This pattern also occurs in Biscuit ware (see fig. 72), while the longer pendent triangle pattern is very common in Glaze I Red ware. The few Black-on-white vessels which have the longer triangle pattern (fig. 16, *a*, *b*, *c*) are from the very end of the Black-on-white phase, which extended into Glaze I Red times, hence it is very probable that they are out-and-out imitations of Glaze patterns. It is noteworthy that the upper framing line is broken in every instance in which it occurs in this group of pendent triangle patterns, with the exception of two fragments (fig. 16, *e* and *f*) which do not afford conclusive evidence.

Examination of fig. 16, *a*, *b* and *c* reveals strong affinities to the paneled band layout. The triangle in each case is sufficiently elongated to afford considerable space between base and hypothenuse, and this space is subdivided for the creation of smaller decorative areas, which in treatment greatly resemble the classic paneled band treatment of the majority of Pecos Black-on-white ware. It seems reasonable to consider these large triangles modifications of the earlier band, a deconventionalization to the extent of rendering its form less rigid, its lines more free and sweeping. If such be the case, Black-on-white may perhaps have made a definite contribution to Glaze I Red design and not, as suggested above, have merely imitated it during Black-on-white's terminal phase.

SUMMARY

The identification of types and sub-types in so amorphous a ceramic group as Pecos Black-on-white may appear to be a needless elaboration—an over-emphasis of detail. It seems justified, however, on several grounds. First of all, Pecos Black-on-white, despite its local character and its relatively short duration, is a complex of widely varied traits closely intermingled. Every acceptable diagnostic feature—rim-form, size, color, paste, finish, decoration—exists in bewildering variety in this small group. The mere enumeration of them would have characterized the situation, but only an attempt to determine their interrelationships and their common traits could hope to clarify it. This was done, and the two categories of Rough Exterior and Polished Exterior ware, with their types and sub-types, seemed to stand forth with sufficient clarity to warrant recording. Another reason may be given. The Black-on-white wares of the Rio Grande are little known at present. It is quite possible that a minor group at Pecos may prove later to be a major group somewhere else. In that event it will be useful to know that the type has been found at Pecos, and in a clearly defined chronological horizon. Pecos may have been a dominant site, a focal point, even in Black-on-white times; and it may hold the clue to a ceramic complex in that early time, of much greater extent and significance than is now known. Viewed in this light, the situation holds nothing to warrant us in dismissing the earliest ware of the Pecos ceramic series as of purely local interest, or in affecting to see in it a homogeneity which in fact it does not possess. Indeed, I feel that far from overemphasizing the many diverse traits encountered in this small group, I

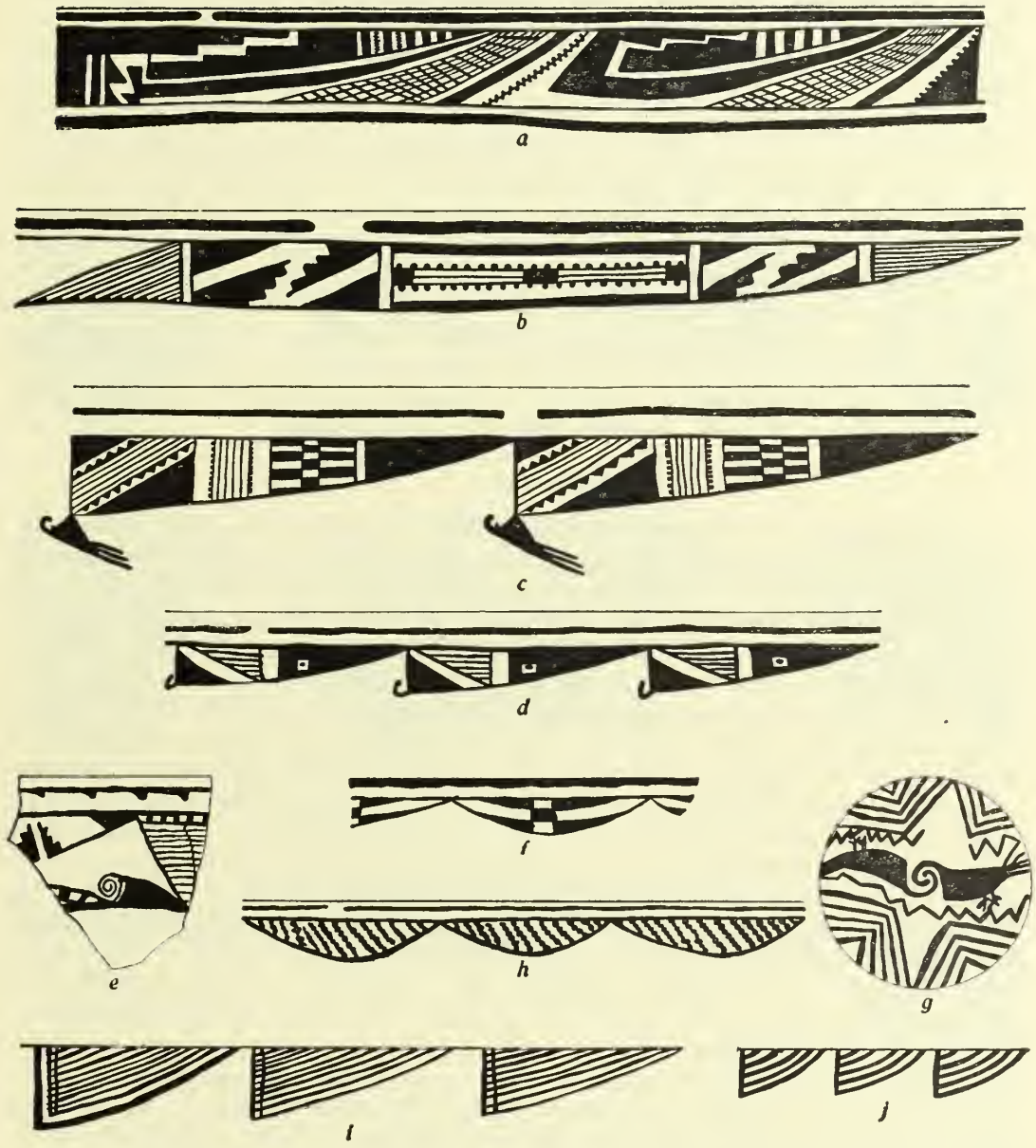


Fig. 16. Black-on-white. Pendent triangle and allied patterns. Wares represented: Crackle, *a*, *e*; Late Crackle, *g*, *h*; Clay, *d*, *f*; Biscuitoid, *b*, *c*, *i*, *j*. About one-third natural size.

have probably underestimated a number, and thus perhaps lost the most significant clues of all.

A summarized statement of the outstanding general characteristics of the group follows.

FORM

The bowl is the outstanding form. Olla fragments are very rare, and many of them arouse suspicion of being intrusive pieces, either from the San Juan region or from elsewhere in the Rio Grande area. Ladles, mugs, seed jars, pitchers, are even scarcer than ollas. Canteens are not common, yet occur more frequently than the other non-bowl forms mentioned, and were undoubtedly made locally. Bowl form is variable and not easily characterized. However, the form tends toward the hemispherical or half-egg shaped, with rather straight rising sides. Measurements range from diameters of 4 to 6 inches with depths of about 3 inches, to diameters of 12 to 14 inches, with depths of 5 or 6 inches. A practical, simple bowl form is the aim throughout, size in general increasing from early to late times.

RIM FORM

Rim form is an important criterion of chronology and type in the Glaze wares of Pecos. Each of the five glaze phases has its distinctive rim, from which departure is made only by way of brief transition to the type which follows in the series. This same rim-consciousness is apparent in Biscuit ware, where rims are standardized and completely coordinated with the other features which distinguish types and subtypes within the general group. If this logical and satisfactory state of affairs prevails also in Black-on-white, a great deal of search, by several different persons, has failed to bring it to light. There is however, a broad general relation of rim form to technological type and to chronology, recognizable only through study of a large mass of material, and careful notation of results. The stratigraphic tests and graphs made therefrom have illustrated this point. It suffices to say that the early period shows a great majority of thin or pinched rims, that the round and square rims divide about equally the honors of the middle period, with outcurved rims rising rapidly from virtual non-existence to the ranking place at the close of the phase. Coupling this evidence with that of paste, we find that the early Blue Paste ware with rough and dusty exterior is largely a thin rim group. The coarsely tempered Polished Exterior ware of the middle period runs, in the better examples, to rounded and square rims, particularly the latter. The outcurved rim is associated with the late soft paste ware, the Biscuitoid, but more particularly with the break-down or final phase of the Polished Exterior ware. This, briefly summarized, is the evidence of the statistical tables based on the study of stratified material; and these conclusions are borne out by personal observation, if due allowance be made for the many instances of non-conformity occurring in this group in which ceaseless experimentation and incertitude seem to replace the established canons of ceramics which fortunately held the majority of prehistoric Pueblo wares upon a steadier course.

DECORATION

Color, usually an important decorative feature of painted pottery, has little distinction in Pecos Black-on-white. The long gradual swing from dark blue-black paint upon a grey-blue background to a more definitely black paint upon a relatively white or cream-colored ground is the most notable feature of color. Here, as elsewhere, exceptions must be noted, for excellent combinations of white or cream-

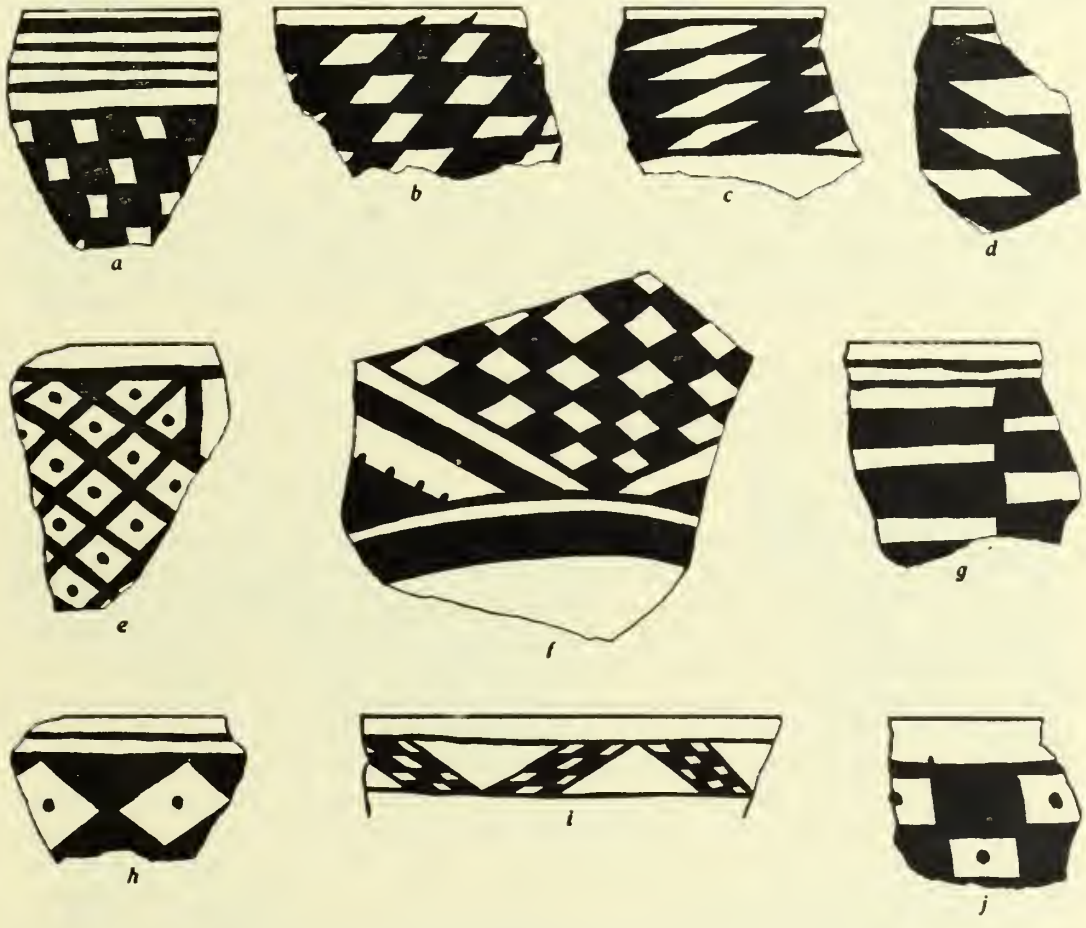


Fig. 17. Black-on-white. Checkerboarding. All these examples are from Pecos. Checkerboarding is perhaps even more common at Forked Lightning. Length of sherd *f*, 5 inches.

colored slip with a definitely black paint occur throughout, just as the blue-toned color category persists to the very end of the phase.

Line decoration is dominantly of the band type, usually with one framing line below the band, and one above. Occasionally the top framing line is broken, especially in late times. Band patterns with multiple framing lines above, or with none at all, occur frequently, however. The band is ordinarily subdivided, either by

paneling or by zig-zag line division, and the areas thus set off are filled with design usually composed of opposed key, stepped triangular, or dentate figures set diagonally within the space. Frequently one set of figures is hatched, its opponent solid black. Band patterns are often checkerboarded in either rectangular or triangular units, without subdivision of area (fig. 17). Pendent triangles are a favorite motive, occurring sometimes at the rim, often toward the bottom of the bowl, below multiple parallel circling lines. All-over patterns occur, perhaps less frequently in early than in late times. Division is usually in fours.

It is common to place a single figure, often the hour glass or the Maltese Cross, perhaps a conventional bird or pair of birds (fig. 18), in the very center of the bowl, to break the blank circular area formed by the main pattern. The use of isolated figures in any other manner, or of symbolic forms is rare. Truly naturalistic representations are unknown.

A conspicuous feature of design is the rarity of the curvilinear. Occasionally it is attempted with pitiful results (fig. 19). The dominant impulse of the Pecos decorator of Black-on-white times was to create either a simple encircling continuous pattern or a banded pattern rhythmically subdivided, using purely geometric rectilinear elements.

Outside decoration rarely occurs. Rims are sometimes ticked, the square rims of exterior polished ware in particular, while the outcurved rim, never until very late a common type, habitually bears either a zig-zag line or a series of broad ticks, upon its lip.

PASTE

Judging by general appearance and observation under the magnifying glass, in the absence of more searching and scientific methods of studying the basic materials of pottery, the Black-on-white ware of Pecos seems to give evidence of the use of clays of two colors—bluish and brownish. The brown clay occurs almost entirely in finely tempered form. It was used sparingly in early times, and more commonly in the late phase, when the influence of Biscuit ware perhaps became a factor in popularizing it. The paste of Biscuit ware bears considerable resemblance to the brownish, finely tempered paste of the Biscuitoid type of Black-on-white ware.

The bluish clay is the basic ingredient of a widely-disseminated group of wares in the Rio Grande region. It is most prominent at Forked Lightning in early times. Pottery made with it falls naturally into two categories, determined largely by tempering. When finely tempered this clay produces a fine-grained ware with a distinctly dusty aspect. It wears down evenly and easily, like fine sandstone, which it resembles somewhat in feel. Much handling of it leaves the hands dusty. Ware of this type, called Blue-gray, ordinarily has a rough, unslipped exterior and a bluish thinly slipped interior. Cleavage is even and rather smooth.[1]

Mixed with coarse temper, apparently sand, the bluish clay produces a ware of quite different character. Without differing much from the other in general color, it is

[1] Sherds from Rowe and Dick's Ruin, near Pecos; from Tecolote, 30 miles to the east; and from the Greenlee ruin near Abiquiu, in the Chama Valley, are outstandingly of this bluish, soft, and finely-tempered paste: the type which has been called Blue-gray at Pecos. It comes nearer than any other ware known to the writer to being the typical Rio Grande Black-on-white.

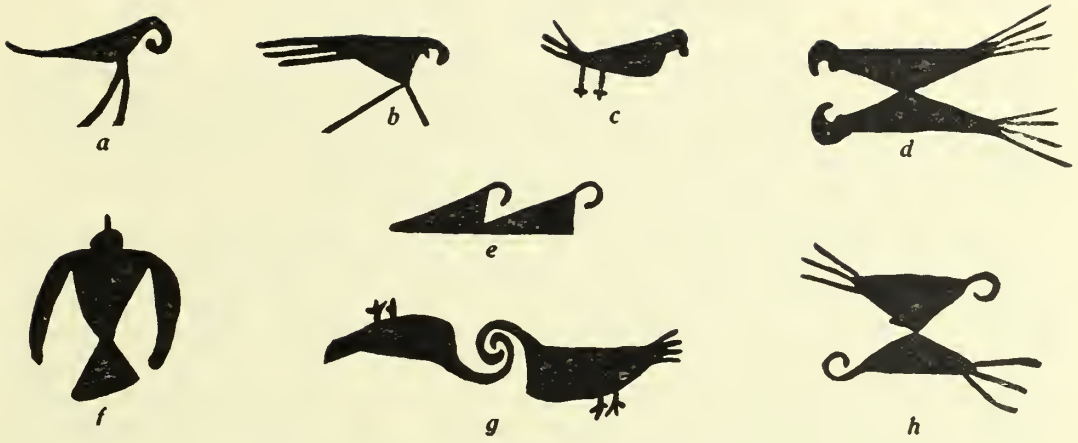


Fig. 18. Black-on-white. Bird forms. *e:* Two units from a pattern of small pendent triangles (see fig. 5, *j*). Whether or not these should be considered bird representations is uncertain. They suggest, however, the possible derivation of the triangular-bodied bird from a purely geometric figure through addition of a crook to indicate the head. *d*, *h:* Double birds which are merely hour-glass figures (cf. fig. 5, *e*) with addition of heads and tails. About one-half natural size.

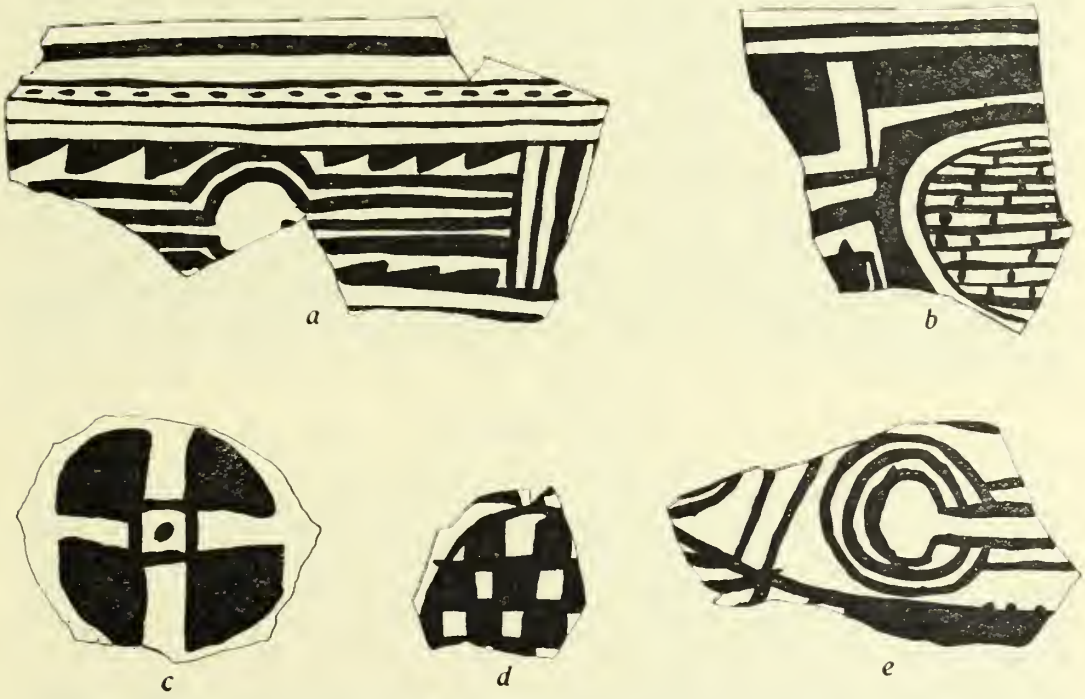


Fig. 19. Black-on-white. Curvilinear decoration. These five sherds, with the bowl illustrated in fig. 14, *h* are the only instances of curvilinear treatment observed at Forked Lightning or Pecos. Length of sherd *a*, 6 inches.

hard, susceptible of high polish inside and out (if diligently "floated" to submerge the coarse tempering matter), very granular in cross section and rough and irregular in cleavage. In its best form this ware shows a characteristic fine crackling of the interior and exterior slip, and has accordingly been called the Crackle type. It is most characteristic of late Forked Lightning and early Pecos.

Thus three groups seemingly based largely on basic components have been distinguished: soft-paste brown, soft-paste blue, and hard-paste blue. Many intermediate varieties occur, due apparently to a mixture of these components, and to this circumstance may be attributed much of the variability of Pecos Black-on-white ware. Much of its poor quality seems due to the same cause. The soft-paste categories do not yield readily to polishing, while the hard-paste category is miserable stuff if left unpolished. The brown paste seems often not to hold the bluish slip, which sloughs off. Too much fine or too little coarse temper, a compromise of categories, produces ware of unpleasing texture and appearance, neither rough nor smooth, which is hard to characterize. Often it is thinly slipped in white. Generally speaking, adherence to one of the three basic combinations described above gives the best results.

One might advance as a hypothesis that the true Black-on-white wares of the Rio Grande region (leaving out Jemez Gray, which occurs too late to be associated with the others) have gone through a process of development somewhat as follows: 1. A blue-gray, hard paste ware was introduced from the northern San Juan (probably via the valley of the Chama) in late Pueblo II or early Pueblo III times; 2. For some reason, presumably connected with local clay supply, it became a soft-paste ware of equivalent hue and general style; 3. This in turn merges with a soft-paste brown which culminated in Biscuit, the hard-paste technique being revived in late times and perpetuated in the Glazes of the region. The foregoing is based on admittedly scant knowledge, and rests on two suppositions, either or both of which may prove fallacious. They are: 1. The dominance of San Juan influence; and 2. The influence of local materials (clay and temper) upon the evolutionary process. At any rate, it is tempting to toy with the idea that the duality of wares of later times, the soft-paste exemplified by Biscuit, the hard-paste by Glaze, is foreshadowed in Pecos Black-on-white.

CONCLUSIONS

Pecos valley Black-on-white ware is apparently not very different from that of the rest of the upper Rio Grande region. That region is known so widely as the home of Biscuit and of a series of no less characteristic Glaze wares that its Black-on-white horizon has attracted little attention. Yet Black-on-white occurs everywhere in the upper Rio Grande. Nelson finds it in the Galisteo Basin, Kidder on the Pajarito Plateau, Jeancon in the Taos Valley. A number of sites in the vicinity of Pecos reveal its presence; the relatively large ruin at Tecolote just west of Las Vegas, on the very verge of the Plains, in apparently pure Black-on-white; so too is a smaller ruin east of Watrous in the Canadian River drainage—the farthest east of known

Pueblo sites. The large ruin on the Greenlee ranch at Abiquiu has its Black-on-white horizon[1].

Like Forked Lightning and the first settlement on the Pecos Mesa, all of these sites give every indication of being the earliest in their locality; yet none of them seems older than Pueblo III. Remains apparently of Pueblo I were found by Kidder at Fort Marcy in the vicinity of Santa Fe[2], but none on the Pajarito, none in the Pecos Valley. Pueblo culture evidently reached a large portion of the upper Rio Grande region in relatively late times, and in well-defined form, coming from an area which had already attained the culture level of at least Pueblo II. What was that area? The writer has concluded that it was the San Juan, and has presented a number of points in evidence to that effect, all of purely ceramic import, to be sure. This can and by all means should be tested out along other lines: kiva and house type, manos and metates, flaked stone implements, stone axes, agricultural products, pictographs, suggest themselves at once as significant criteria.

Ceramic evidence tends to indicate that a well-defined ceramic style migrated some three to five hundred miles into virgin territory, and rather quickly and thoroughly established itself there. If so, the situation is ideal for a study of culture migration. The centre of diffusion and the area affected are quite well known and fairly definitely segregated; the problem stands forth in exceptionally clear-cut form. Precisely what happened? What traits came along, what remained behind? Which stood unchanged, which were modified; how, and to what extent? Culture migration has been the subject of much speculation and theory. Here in the Rio Grande, and particularly in the Pecos Valley, is an opportunity actually to study it. But the study must begin in the San Juan, the route of migration be followed up, and the changes noted along the way. The problem in its application to ceramics resolves itself into a determination of precisely what traits of form, technique and decoration went afield originally, from where and in what time; then to tracing their geographical diffusion and their subsequent development in their new habitat.

It is probable that some modification had taken place before the ceramic style of the San Juan reached Pecos; that it came not in one long jump but in a series of short steps. There should be Rio Grande ruins earlier than Pecos, and nearer the San Juan. Until they are revealed, we can only say that Pecos suddenly came into being, with the Pueblo people of the San Juan apparently, somehow, indirectly responsible.

Just as it is to be inferred that there are sites which reveal a closer connection with the San Juan, there should also exist a site, or a locality, where these presumably foreign ceramic traits first tended toward Biscuit, that ware which is peculiar to the Rio Grande. In much the same manner that Pecos Black-on-white gives many indications of having been fostered in the northern San Juan, Biscuit appears to be a development from some form of Rio Grande Black-on-white. This almost certainly did not take place at Pecos, for there no transitional phase is found. Biscuit appears

[1] When the results of the surveys being carried on by Mr. R. G. Fisher for the University of New Mexico, and by Dr. H. P. Mera for the Laboratory of Anthropology, are published, we shall have much fuller knowledge of the distribution of Black-on-white wares in the Rio Grande drainage.

[2] Verbal information to the writer.

full-blown, before Black-on-white dies. But it probably did happen somewhere not far distant, in a site or a locality in which the ceramic complex was very similar to that of Pecos in late Black-on-white times. Many decorative characteristics of the earliest Biscuit occur in rudimentary form in Black-on-white; the soft paste and rough exterior texture of Biscuit ware are no new thing, Pecos proves that. Here again is a problem, clear-cut: that of the development of a highly specialized local ware, which comes in so late chronologically that its immediate antecedents should be quite readily isolable, and every step of its development easily followed. There are few wares in the entire Southwest of such strong individuality, which are so situated that they can be segregated and thoroughly studied from beginning to end.

Black-on-white contributes to its other successor, Glaze I, as it does to Biscuit. While the technique of glazing probably came from the Little Colorado region, decoration, in the initial phase of the ware, has certain local traits. The paneled pattern obliquely divided, the key and terrace figures, so frequent in Glaze I have their counterpart in Black-on-white. All in all, it seems that the entire ceramic development of the upper Rio Grande must be referable in some measure to Black-on-white, despite the fact that the latter came in late, developed erratically and unsoundly (if Pecos is a criterion), and endured but a short time. Black-on-white evidently does not originate in the Rio Grande, but the later Rio Grande wares do, to all appearance, originate to some degree in Black-on-white. The ceramic history of this region, which looms so large in the closing periods of Pueblo culture, can never be an open book until more is known of the initial ware of the series, which began probably a thousand years ago, and in the pottery of the modern pueblos, continues still.

PART TWO

BISCUIT WARE

The term "Biscuit", suggested by the resemblance of this ware to china in the preliminary or biscuit stage of manufacture, was first used in the writer's field notes of 1907, to distinguish from the well-known Black-on-white wares of the Southwest, a peculiar, soft, light-colored pottery also decorated in black which Dr. S. G. Morley and I encountered during excavations we were conducting under direction of Dr. E. L. Hewett at Puyé on the Pajarito Plateau, New Mexico. Large collections of the ware had been made a few years previously by Dr. Hewett at the nearby ruins of Otowi, Tsankawi, and Tschirege, and a few specimens had been published, but without specific designation[1].

Biscuit ware has interesting distributions, both chronological and geographical. These, and its relationship to Black-on-white pottery on the one hand, and Modern painted on the other, will be discussed in the conclusion. To preface the technological and decorative descriptions it is only necessary to state that it is roughly contemporaneous with the Glazes, is confined to the northern part of the Rio Grande drainage in New Mexico, and that it seems to be involved genetically with earlier and later dull-pigment wares.

The many bowls recovered by Dr. Hewett on the Pajarito were slipped and decorated both within and without, and for some years I believed this to be characteristic of all Biscuit ware. In 1911, however, Mrs. Kidder and I found a ruin in the village of Agua Fria on Santa Fe Creek, whose Biscuit sherds were decorated only on the interior. As their designs were different from those of Pajaritan Biscuit, and appeared to have some affinity to the designs of the ancient Black-on-white, and as the ruin also yielded glaze-painted sherds which on stylistic grounds seemed older than Pajaritan glaze-painted pottery, we inferred that the Agua Fria specimens represented an early phase of Biscuit.[2] Our material, however, was fragmentary, and our chronological assignment was purely tentative. Hence it was not until the excavations at Pecos were undertaken that it became possible for us confidently to give it type status. The stratigraphic tests made there in 1915 and 1916 showed that our Agua Fria sherds did indeed belong to a well defined category of Biscuit ware which succeeded Black-on-white and preceded the Pajaritan Biscuit. We therefore called it Biscuit A, and termed the latter style Biscuit B, the distinction between the two being that A bowls were only decorated within, while those of B were decorated both within and without[3]. Subsequent work has confirmed the general validity of this grouping, but more detailed stratigraphic tests made in later years have proved that the presence of exterior embellishment is not an infallible

[1] Hewett, 1906, p. 52, pl. XV.
[2] Kidder, 1915, p. 449.
[3] Kidder, M. A. and A. V., 1917, pp. 329, 330.

indication of lateness, for even in very early Biscuit times the outside of a bowl was occasionally decorated. But technological study and design analysis have led to the recognition of less obvious but more exactly reliable criteria of age in shape, paste-color, and ornament which enable one easily to identify such aberrant early specimens. And as no late piece was apparently ever left unslipped on the outside, there is seldom danger of wrong assignment, particularly if the just-mentioned minor points be taken into account in the consideration of doubtful pieces.

BISCUIT A

Biscuit A, the early phase of the ware, differs from Biscuit B, the later phase, in that the exteriors of the bowls are normally unslipped and without painted decoration[1].

Technology

Paste. Soft; much more easily scratched with a steel blade than is that of Black-on-white or Glaze wares. *Fractures* variably, sometimes cleanly, more often with slight irregularities along a generally straight cleavage-line. The ware appears to be fairly durable, for many bowl bottoms have been worn to almost paper thinness or even through, without breakage; yet a bowl mashed down in a grave is often found broken into hundreds of small, flaky pieces. A "woodeny" feel and lack of ring when struck are characteristic. *Color* dark gray (commonest) to almost pure white (rare). Shade sometimes uniform from surface to surface, but usually darker toward the exterior where there is often a well-defined dark streak; central dark streak rare. *Tempering material* not distinguishable with hand lens; there can usually be seen, however, a few pure white flecks and a very few minute mica flakes. *Thickness;* there is little variation from 5/16 of an inch, irrespective of the size of the bowl. In the collection are a few sherds of 4/16, about an equal number of 6/16, one of 7/16, and one of 9/16.

Slip. Applied to interior of bowls including edge of rim. A thin layer of very fine clay, lighter in color than the paste and lacking the mica sparkles occasionally seen in the paste. *Color* an even, dull, light-gray to dirty white, sometimes with a slight olive cast, very rarely yellowish. *Crackling* seldom seen.

Pigment. Deep, dull black with no slaty or rusty cast; holds its color even when brushed thinly. It is "flat" (i.e. does not stand out from the surface); but does not blur or fade along line edges. The "Hawley tests" show the paint to be pure carbon with no iron admixture, and therefore of vegetable origin[2]. It was in all likelihood made, as is the pigment of modern Rio Grande pottery, from the Rocky Mountain Bee Plant or *guaco*, whose preparation and use are fully described by Guthe[3].

[1] There is practically no literature of Biscuit A. The sherds from Agua Fria were briefly described (Kidder, 1915, pp. 447-450). The ware is not mentioned specifically by Nelson, although he speaks of Biscuit decorated on only one side (1916, p. 169). A preliminary description based on a limited number of sherds from Pecos was made by M. A. and A. V. Kidder (1917, p. 329). The illustrations in this volume are the first that have been published. Collections are at Andover (the Pecos material); at the Museum of New Mexico (also from Pecos); there are sherds from many sites in the American Museum of Natural History (Nelson) and the Laboratory of Anthropology (Mera).

[2] Hawley, 1929, p. 740.

[3] 1925, pp. 25, 66.

Finish. Slip well smoothed and shows no tool marks; not often "slick", though an occasional piece has been worked to a beautiful satiny texture most agreeable to the touch. High polish absent. The finish of the unslipped *bowl exterior* is characteristic, the unslipped paste having been brought to an extremely even surface which bears fine, close-set, and generally horizontal scratches, the marks, apparently, of a smoothing or scraping tool.

Vessel Shapes

There is apparently but one, the bowl. It would naturally not be possible to distinguish olla fragments of Biscuit B from those of Biscuit A on the criterion of exterior embellishment, for all ollas which are decorated at all are painted outside. But no Biscuit olla sherd has ever been noted in a deposit or stratigraphic cut of Biscuit A period, nor does any olla sherd bear the decorations characteristic of Biscuit A bowls. I therefore feel quite certain that Biscuit ollas were not made at Pecos before the rise of Biscuit B.

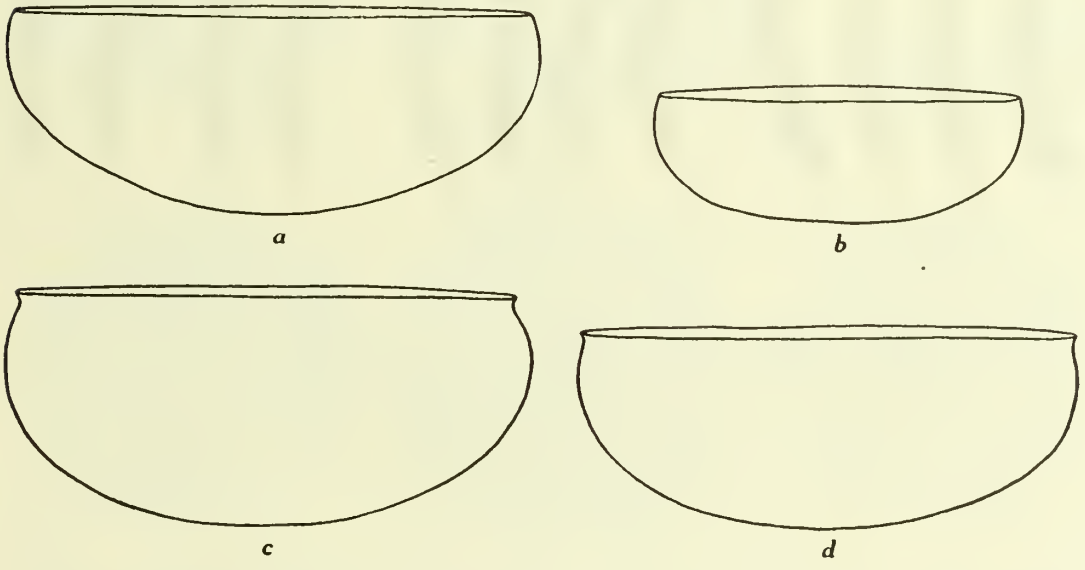


Fig. 20. Biscuit A. Bowl shapes. *a*, *c*, *d:* Large bowls; *a*, plain rim; *c*, flaring rim; *d*, semi-standing rim. *b:* Small bowl. Diameter of *c*, 15¼ inches.

BOWLS

A classification of the bowls reveals the following groups:

- Small
- Large
  - Plain rim
  - Flaring rim
  - Semi-standing rim

There are, it will be seen, only two general sorts of bowls, the small and the large, but certain minor differences serve to divide the large bowls into three sub-types. All specimens both large and small are notably symmetrical; their contours are sure and true with none of the wavering and uncertainty seen in most Pecos Black-on-white bowls. Vertically perforated lugs occur on one bowl (No. 65074). They are set on opposite sides about ¾ of an inch below the rim.

SMALL BOWLS (figs. 20, *b*; 21, *c*) are rare. Of sherds there are not many and we have but two complete examples; the latter measure respectively 8½ and 9¾ inches in diameter. They are relatively shallow, having width-depth indices of .40 and .35. Their capacity is 2 dry quarts (2.2 liters). The bottoms are almost flat and the sides curve strongly, drawing in a little at the top so that the point of greatest diameter is slightly below the rim. The rim is unthickened and has a flat edge (fig. 22, *a-d*).

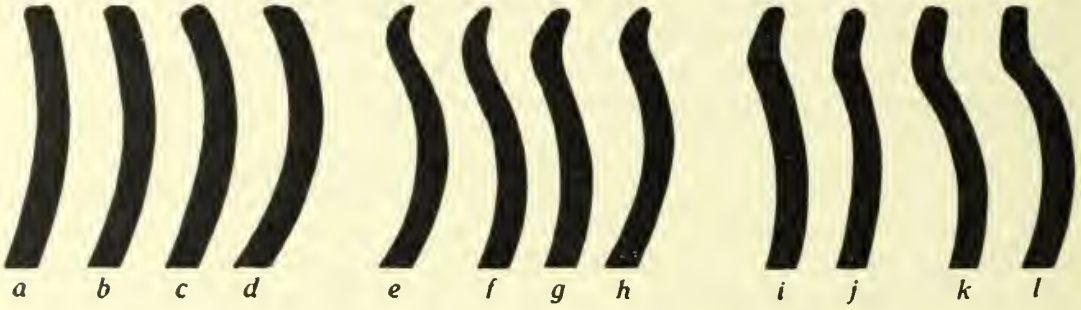


Fig. 22. Biscuit A. Bowl rim profiles. *a-d:* Plain. *e-h:* Flaring. *i-l:* Semi-standing. Height of sections, 2½ inches.

LARGE BOWLS (figs. 20, *a*, *c*, *d;* 21) are remarkably uniform in size, the range in diameter of the twenty-odd measurable specimens being only from 13¼ to 15¾ inches, and the depth index from .38 to .45. The capacity is from 8 to 9 dry quarts (9 to 10 liters). The bottoms are somewhat rounder than are those of the small bowls. The lower sides therefore rise less abruptly but, as in the small bowls, the upper sides are rounded and draw in toward the top, so that the point of greatest diameter is below the rim. The three sub-types mentioned above are based on rim-form. They are: bowls with *plain rim*, with *flaring rim*, and with *semi-standing rim*[1]. In bowls with *plain rim* (fig. 20, *a*) the even contour of the vessel wall continues with no thickening or thinning to a flat edge the corners of which are slightly softened, the outer one a trifle more so than the inner (fig. 22, *a-d*). The rim of bowls with *flaring rim* (fig. 20, *c*) swings distinctly outward, thins a little and terminates in a rounded edge (fig. 22, *e-h*). The rim of bowls with *semi-standing rim* (fig. 20, *d*) turns less sharply outward (fig. 22, *i-h*); it is usually unthinned and the edge is round or flat; the inner face of the rim is more nearly a plane surface than is that of the flaring rim.

[1]True standing rims are exceedingly rare in Biscuit A. In Kidder, M. A. and A. V., 1917, p. 329, we gave this rim type status, but examination of whole vessels, which were not available when that paper was written, shows that in our sherd study we misjudged the angle of the vessel wall and so failed to note the slight flare which almost always exists.

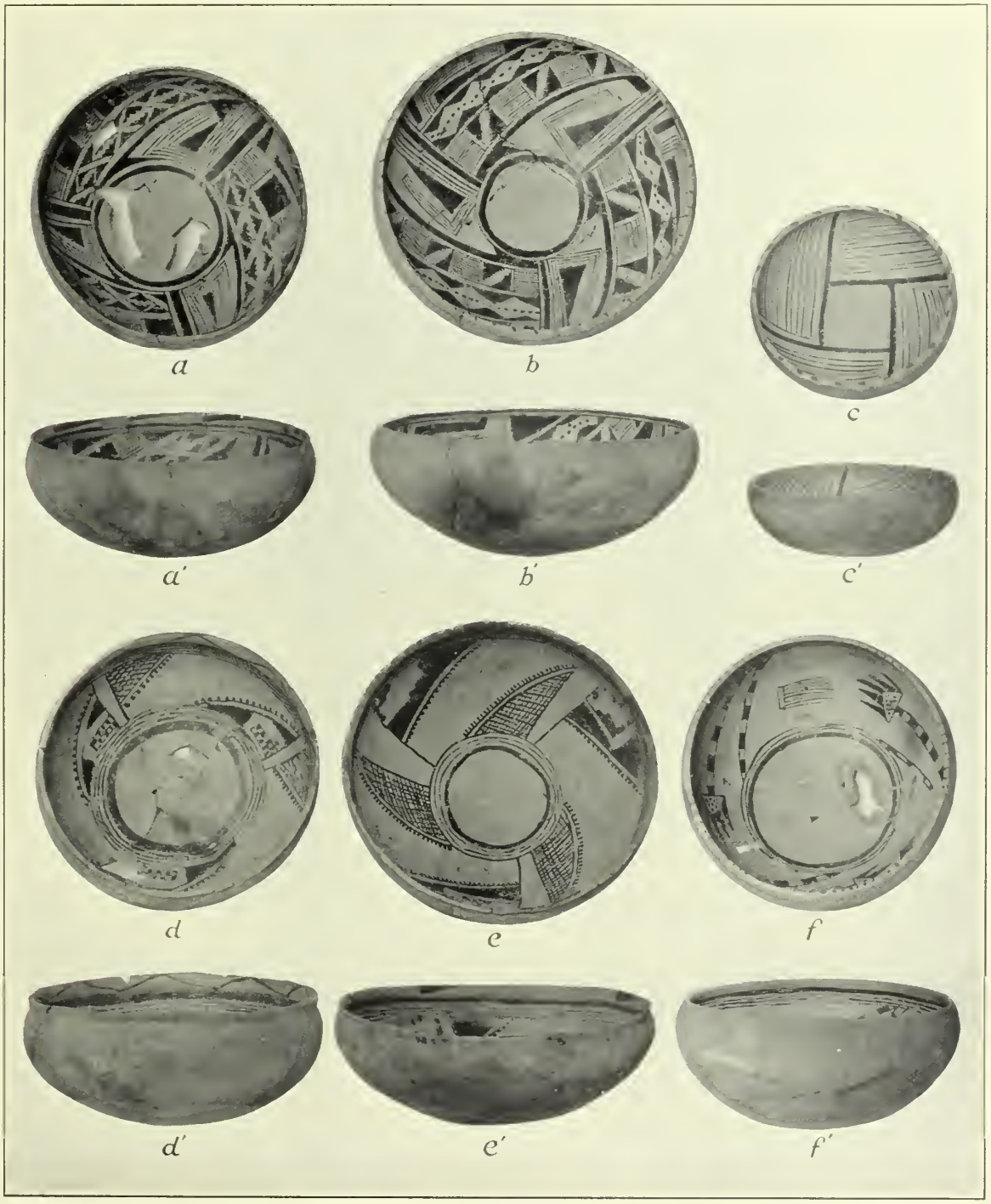


Fig. 21. Biscuit A. Typical bowls. Note undecorated exteriors and elegance of shape. *a, b:* Bar paneled band decoration. *c:* Quadrate pattern with pendent triangles. *d e:* Standard band decoration. *f:* Band *Awanyu*. Diameter of *b*, 15½ inches.

Of our whole bowls the majority have either flaring or semi-standing rims, and a count of the large sherd collection shows that there are 70% of these as against 30% of the plain type. The flaring and semi-standing grade into each other so imperceptibly that accurate segregation is impossible, but it is obvious that the flaring are commoner than the semi-standing, and that as the latter approach a true vertically standing form they become fewer and fewer.

Decoration

Biscuit A bowls are normally decorated only on the interior. The main pattern covers that surface almost entirely, but leaves open a small field in the bottom. A minor decoration is applied to the rim. Heavy ticks widely and regularly spaced, or closely set in spaced groups of ten or so, habitually appear on the flat edge of plain rims. The same is true of the rounded or squarish edges of semi-standing rims. The rather sharp edge of flaring rims was seldom ticked. The inner face of flaring and semi-standing rims always bears decoration. Simple forms are: a succession of single heavy dashes, usually running obliquely downward to the left (fig. 23, *a*, *b*); heavy rectangular or triangular marks (*c*, *d*); short bent lines (*e*); doubly bent lines (*f*). The zigzag (*g*) is common. More elaborate treatments are: small hatched triangles (*h*); and long, narrow figures (usually four to the circumference of a bowl), hatched (*j*) or marked to resemble checkerboarding (*k*); alternation of such long figures with ticks or crosses seems, from the sherds, often to have been practised. I have been unable to correlate particular rim treatments with one or other of the decorative systems to be described below.

Occasionally there is a single independent naturalistic figure occupying an open space in the main pattern (figs. 35, *a;* 40, *a*).

The main pattern covers a large proportion of the surface, but it is usually composed to so great an extent of relatively narrow lines, and these are so widely spaced, that much of the background appears. The brushwork is slipshod, little or no care having been taken to make lines of even width, to space them accurately, to run them exactly parallel to each other, or to produce neat junctions. Yet the broad contrasty effects which are achieved, and especially the sense of motion produced by the dextrally whirling arrangements, very successfully carry off the slap-dash painting. The strength and dynamic qualities of the designs and also their consistent tripartite division can best be seen in the groups of bowls seen in full-view (figs. 21, 24, 34). The same illustrations make clear an extraordinary uniformity of decorative conception. This is a marked characteristic of all Pecos wares subsequent to the riotous Black-on-white, but in the case of Biscuit A (as in the contemporaneous Glaze I) there is a skillful variation of the few devices employed, and a freshness and vigor of rendition that are all too rare in later styles.

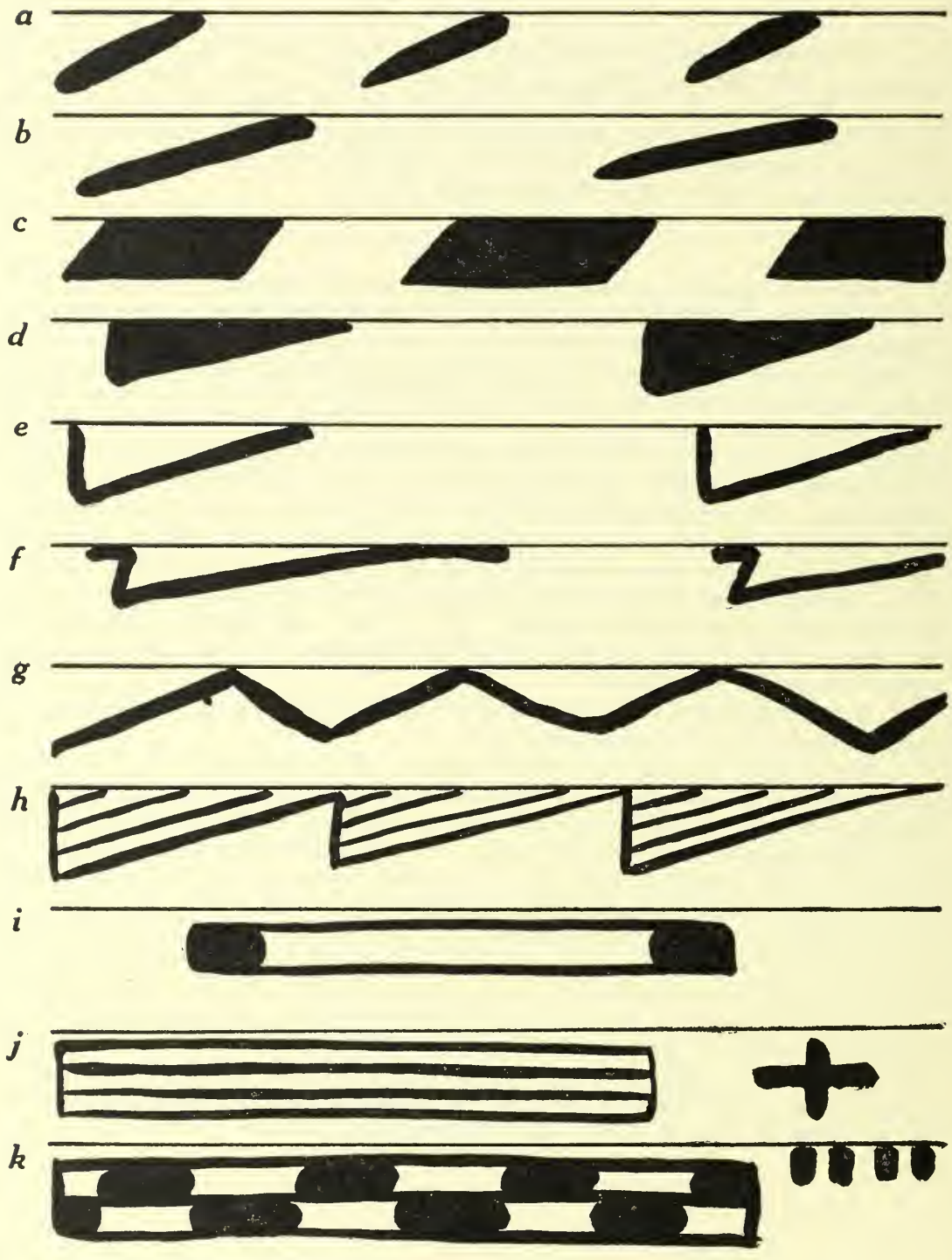


Fig. 23. Biscuit A. Decorations from inner face of flaring and semi-standing rims. Natural size.

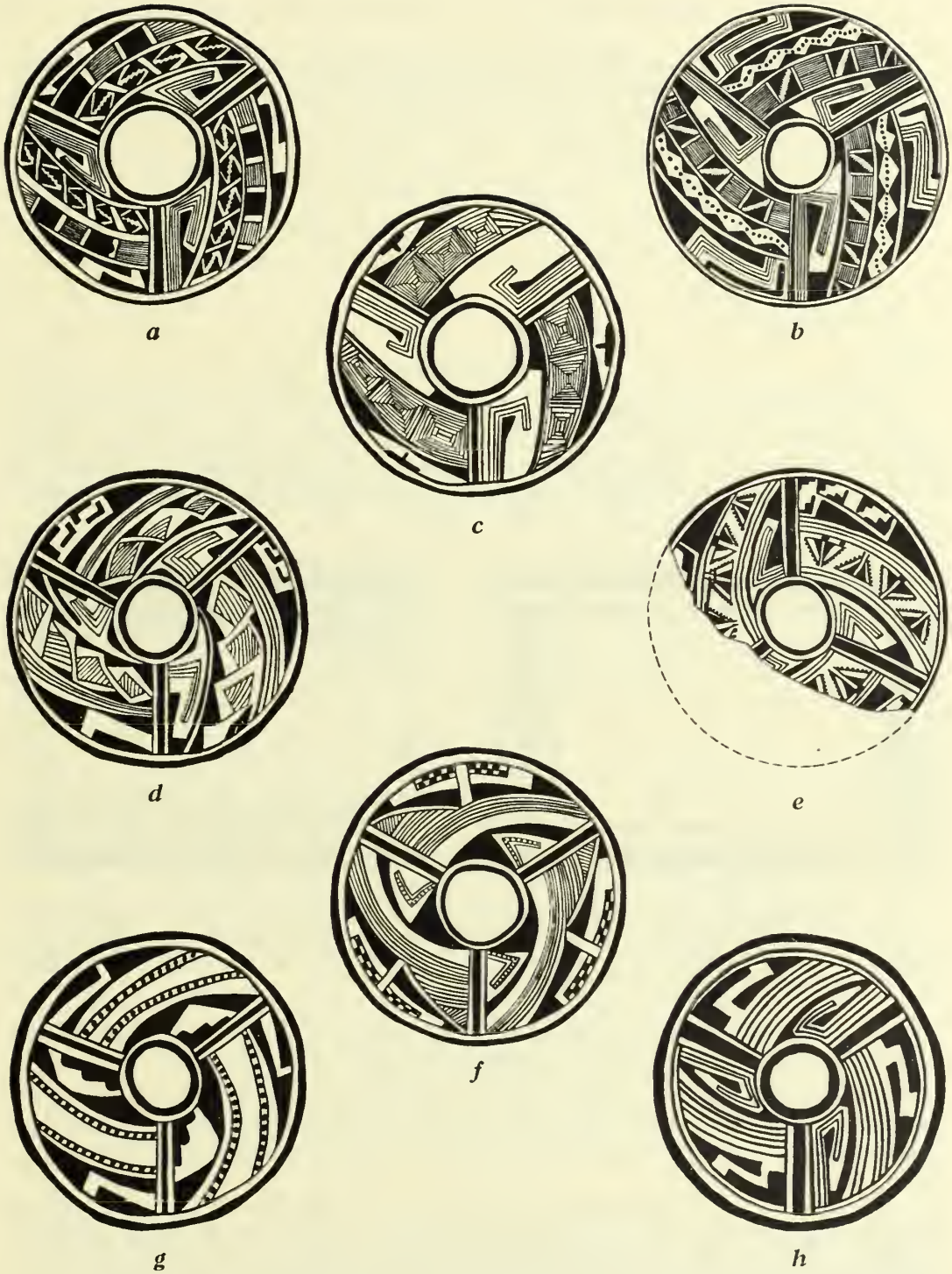


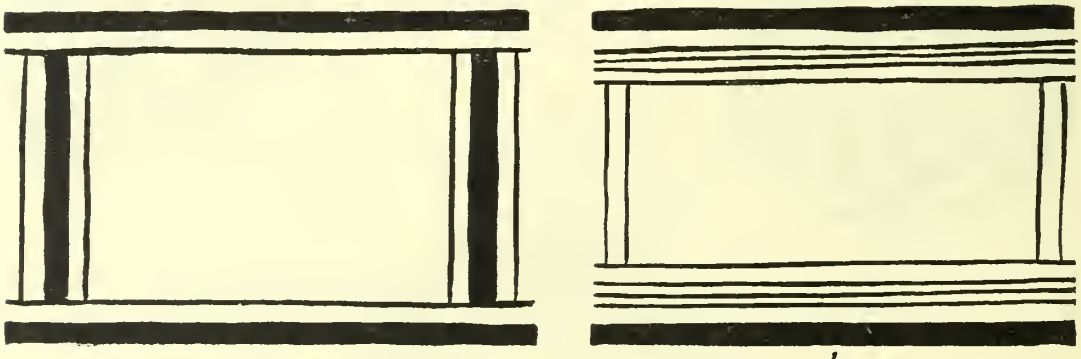
Fig. 24. Biscuit A. Bowls decorated with the Bar-paneled band. Note great width of band, which leaves only a small open space in the bottom of the bowl; also the heavy bars used to divide the band into three panels. For enlarged drawings of single panels from each of these bowls, see corresponding letters of fig. 28. Average diameter of bowls, 14 inches.

The above-mentioned uniformity renders classification based on general layout unusually easy. The following categories are represented in the thirty-five pieces sufficiently complete to study:

Band patterns		33
Bar-paneled bands	16	
Standard bands	12	
Awanyu bands	4	
Unclassified bands	1	
Pendent patterns		1
Quadrate patterns		1

BAND PATTERNS

BAR-PANELED BANDS (fig. 24). The bands are normally cut into three panels; these are separated from each other by heavy bars. Also diagnostic is the great width of the band, which leaves clear only a small circular space in the bottom of the bowl. And, finally, the decorated surface is more closely covered, and by smaller figures, than is the case in any other Biscuit group.



a *b*

Fig. 25. Biscuit A. Framing and paneling systems. *a:* Bar-paneled arrangement; single heavy framing line above and below; heavy unengaged paneling bar between narrower engaged paneling lines. *b:* Standard band arrangement; heavy outer framing lines with multiple lighter framing lines within them; panels separated by narrow open space between the paneling lines; no paneling bar. Diagram.

Area covered. Bowl interior from ½ inch below edge of plain rimmed pieces, or from just below outcurve of rim, if flaring, nearly to the bowl bottom.

Framing. (fig. 25, *a*). Single unbroken framing line ¼ to ½ inch wide just below rim; single unbroken framing line of same width at bottom of band. Banding line 3/32 to ⅛ inch wide at top and bottom of band set about ⅜ inch from the framing line.

Paneling (fig. 25, *a*). Uniformly three panels, set apart by a broad, free-standing paneling bar of same width as or somewhat greater width than the framing line. Engaged paneling line on either side; same width as banding line and spaced to correspond with distance between banding line and framer.

Panel layout. Due to the great width of the band, each of its panels is much broader at top than at bottom (see fig. 26, *a*); it thus differs strongly from the rectangular panels produced by the subdivision of narrower bands. It is usually laid off for decoration by drawing lines obliquely upward from left to right, producing a triangular area in the upper left (fig. 26, *b*, "a") and lower right ("b") corners, and a broad oblique space between ("c"). This is the normal layout; there are two cases (figs. 26, *c;* 27) of subdivision by bent lines parallel to the upper and side margins of the panel; and one (figs. 26, *d;* 34, *h*) of X subdivision.

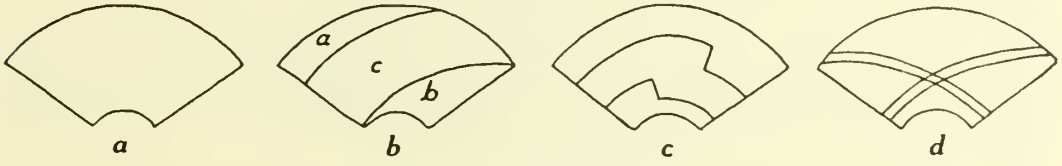


Fig. 26. Biscuit A. Structure of panel in the Bar-paneled band. *a:* Shape of the panel. *b:* Normal method of panel subdivision. *c:* Panel subdivision by "jogged" lines. *d:* X-subdivision. Diagram.

Panel design (fig. 28). The normal method of panel subdivision produces, as has been said, three fields, "a", "b" and "c" (fig. 26, *b*). The "a" field is reduced in area by cutting off and filling with black its two acute angles, in which case the reserved or open space is rectangular (fig. 29, *a*, *c*, *e*); or by filling the more acute angle and drawing in and filling a triangular space along the hypothenuse, in which case the reserved space is L-shaped (fig. 29, *d*, *g*).

In the reserved space are placed key figures (fig. 29, *d*, *e*), opposed black and hatched strips (fig. 29, *g*), or plain black foils (fig. 29, *a*, *c*). In the series there is only one "a" field with unorthodox treatment (fig. 29, *h*), a preliminary division into three triangles, one of which is hatched, the other two having their angles cut off and filled with black in the same way as normal "a" fields.

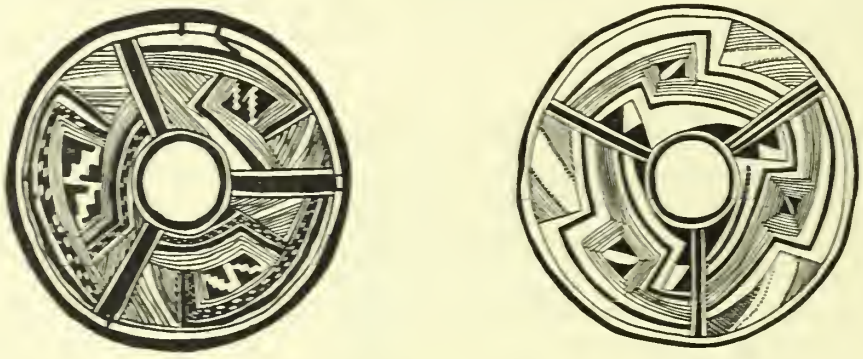
The "b" field (fig. 26, *b*) is even more uniformly decorated (fig. 30). A crook-shaped black figure, usually with cut off and filled angles and triangular lower termination is faced by an opposing or interlocking foil composed of two, three, or four parallel lines.

The "c" field, the oblique and usually narrow space between the hypothenuses of the "a" and "b" fields (fig. 26, *b*) may be decorated as a single strip (fig. 31, *c*, *f*, *g*), in which case its width is often somewhat reduced by the insertion of longitudinal lines (fig. 31, *c*, *g*). Or it may be divided into two narrower strips (fig. 31, *a*, *b*). In all cases the strip contains a repeating or alternating design. When the "c" field is much reduced in area by the unusual width of the "a" and "b" fields (see fig. 28, *f*, *h*) it is filled with parallel lines (fig. 31, *d*).

Of panels designed otherwise than in the oblique or "a, b, c" manner there are but three (figs. 27, 32). Two of them are laid out by the painting of heavy lines originating from the paneling lines, running parallel and adjacent to the banding lines, and bent or "jogged" in opposition ot each other. The interspace produced is

filled in one instance with opposed keys (fig. 32, *b*); in the other by opposed triangles within cribbing (fig. 32, *c*)[1]. The only use of X subdivision (fig. 32, *a;* fig. 34, *h*), so common in Black-on-white decoration, is one of the two instances in the collection of static design in Biscuit A, the other being the butterfly band (fig. 34, *d*). In all others there is a definite whirl. In spite, however, of its aberrance in this respect, the pattern is characteristic in the cutting off and painting black of angles, and in the filling of reserved rectangular spaces with opposed keys.

Abnormal Bar-paneled band. The pattern is shown spread out in fig. 33. The framing and paneling lines are conventional, but the band is of much less than the usual width, and it has but two panels: furthermore, the rim of the piece is semi-standing and its edge is ticked, both these last features being characteristic of bowls with Standard bands. An interesting decorator's error appears in the right hand panel; the spacing apparently went wrong and the artist filled an objectionably large vacant space with parallel vertical lines.



a *b*

Fig. 27. Biscuit A. Bowls showing the "jogged line" method of panel subdivision in Bar-paneled bands. For enlarged drawings of individual panels, see fig. 32, *b*, *c*. Diameter of bowls about 14 inches.

STANDARD BANDS. This name is used because it has already been applied to a closely similar pattern extremely common in the Biscuit B decorative system[2]. Biscuit A examples are shown in fig. 34, *a*, *b*, *c*, *e*. They are all found on bowls with outcurved or semi-standing rim.

Area covered. Bowl interior from just below outcurve of rim nearly to bottom. On the average a little less wide than Bar-paneled bands.

Framing (fig. 25, *b*). Heavy top and bottom framers with two or occasionally three narrower lines between them and the banding line; the inner framers and the banding line always of equal weight. No line break occurs.

Paneling (fig. 25, *b*). Uniformly three panels, separated from each other by a narrow vertical open space left between the single engaged paneling line which terminates each panel. In only one instance (fig. 34, *a*) are there unengaged paneling lines.

[1] For description of cribbing see p. 93 and fig. 42.
[2] Kidder, 1915, p. 428, pl. XVIII; and see p. 107 below.

Fig. 28. Biscuit A. Normal panels from Bar-paneled bands. Note the fan-like shape of the panels produced by the great width of the band, the single upper and lower heavy framing lines, the heavy paneling bars, and the oblique subdivision of the panels. For the complete patterns see corresponding letters in fig. 24.

Fig. 29. Biscuit A. Treatment of the "a" field in the Bar-paneled band decorative system. For complete patterns see figs. 24, 28.

Fig. 30. Biscuit A. Treatment of the "b" field in the Bar-paneled band decorative system. For complete patterns see figs. 24, 28.

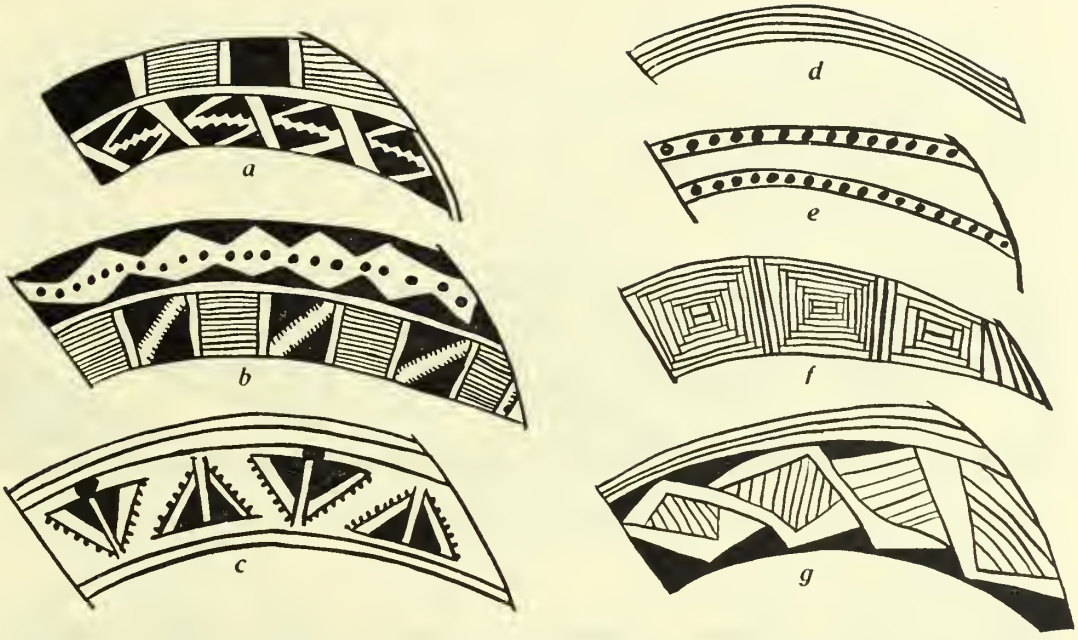


Fig. 31. Biscuit A. Treatment of the "c" field in the Bar-paneled band decorative system. For complete patterns see figs. 24, 28.

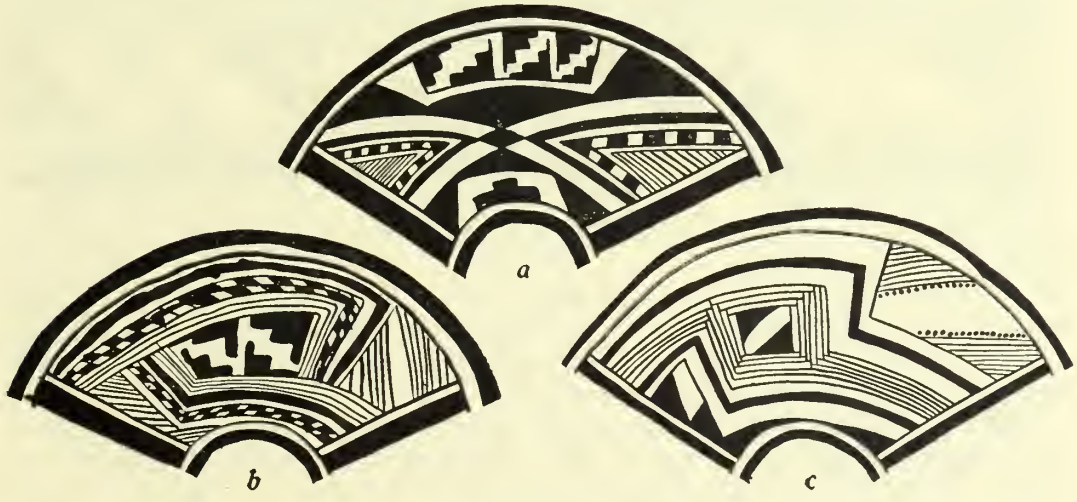


Fig. 32. Biscuit A. Panels from Bar-paneled bands. *a:* X-subdivision. *b, c:* "Jogged line" subdivision. For complete pattern of *a* see fig. 34, *h;* of *b*, fig. 27, *a;* of *c*, fig. 27, *b*.

Panel layout. The band is not quite as wide as in the Bar-panel type, and the space reserved for intensive decoration is further reduced by the multiple framers (compare fig. 25, *a* and *b*). Hence the panels are somewhat more nearly rectangular than they are in the Bar panel system. Each is subdivided by oblique lines which cut off its upper left and lower right hand corners (fig. 36, *b*).

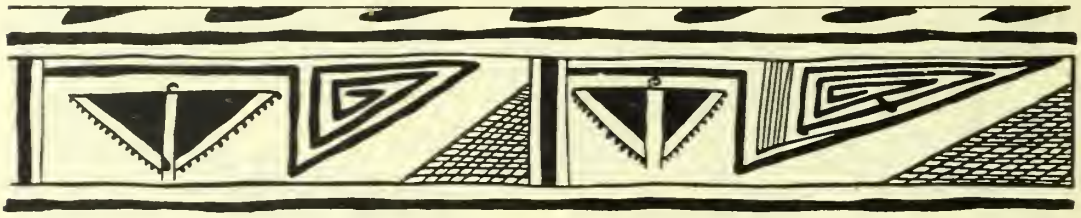


Fig. 33. Biscuit A. Bar-paneled band, unusual in that it has two instead of three panels. Diameter of bowl about 14 inches.

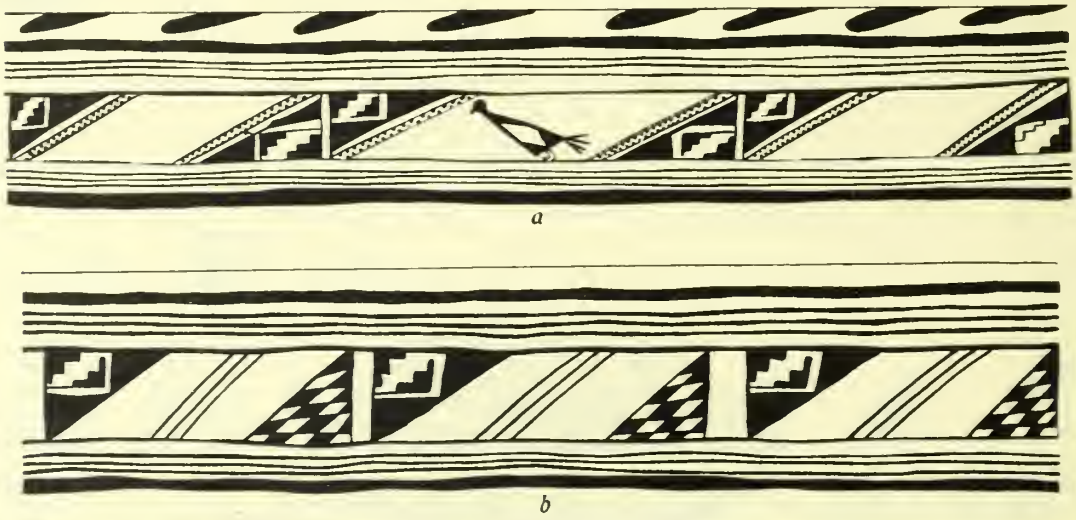


Fig. 35. Biscuit A. Standard bands. Diameter of bowls about 14 inches.

Panel design. The oblique lines produce two right-triangular fields ("a" "b") with an elongated oblique space ("c") between their hypothenuses (fig. 36, *b*). This space is normally left undecorated (but see fig. 37, *f*, *g*, *h*) and attention is devoted to the two triangular fields. The upper field ("a") is reduced in size by cutting off and filling with solid black its acute angles (fig. 36, *c*); this leaves a rectangular field in the right angle. In the rectangle are, in the majority of cases, two opposed key figures, one backed into the upper left angle, the other either on a stalk or set into the bend of a line drawn within the rectangle (figs. 36, *c*; 37, *a-g*). The lower triangular field ("b") is less uniformly handled; it may be occupied by a heavy bent line

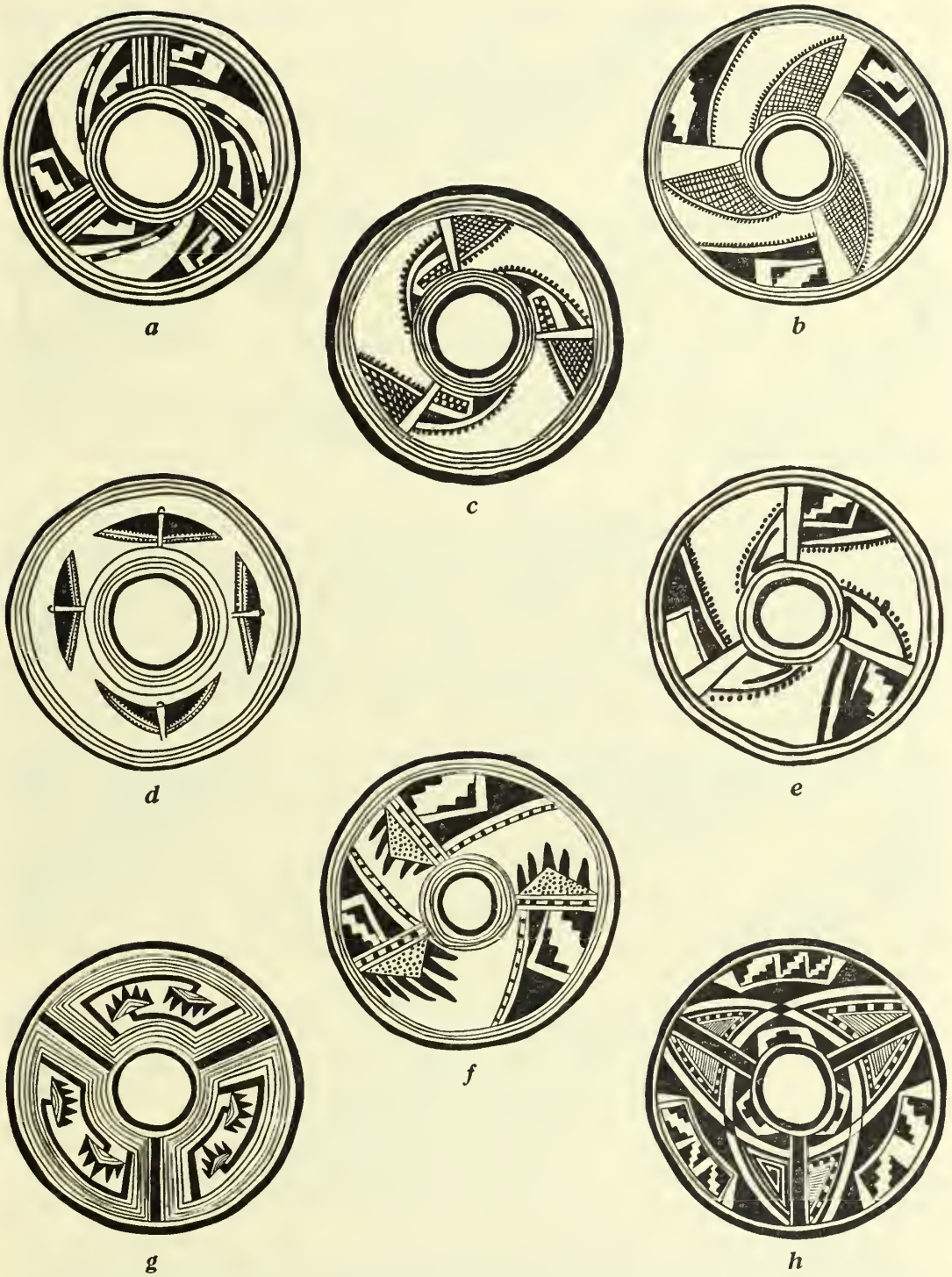


Fig. 34. Biscuit A. Bowls. *a*, *b*, *c*, *e:* Standard bands. Note three-panel subdivision and multiple framing lines. *d:* Bowl with framing typical of Standard bands, butterfly figures. *f: Awanyu* band, framed in the Standard band manner, the *awanyu* bodies being similar to "a" fields of Standard band panels. *g: Awanyu* band in the Bar-paneled manner. *h:* Bar-paneled band with X panel subdivision. Average diameter of bowls, 14 inches.

(fig. 37, *a*, *b*), may have its corners cut off and painted solid in the "a" manner and contain key figures in the reserved rectangle (fig. 37, *c*, *d*, *i*), or may be filled with crosshatching or checkerboarding (37, *e*, *f*). The hypothenuses of the "a" and "b" fields are often paralleled by a dotted line (fig. 37).

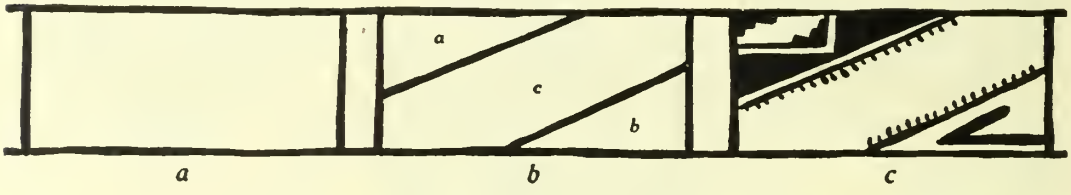


Fig. 36. Biscuit A. Analysis of the Standard panel. *a:* The panel produced by drawing vertical paneling lines between the banding lines. *b:* The "a", "b" and "c" fields produced by drawing oblique lines. *c:* The "a", "b" and "c" fields decorated. Diagram.

The bowls with Bar-paneled decoration are older than those bearing Standard bands. This conclusion was reached on comparative grounds, and was confirmed by study of the sherds from the stratigraphic tests. Suspicion was first aroused by the consistent differences in rim form, Bar-paneled bowls being either plain rimmed or having strongly flaring thinned rims without ticked edge, while Standard band bowls have unthinned slightly flaring or semi-standing rims with ticked edge. Rim shape we knew from study of other categories of Pecos pottery to have been remarkably uniform at any given time, but we also knew that it underwent constant slow changes; and as plain and thinned flaring rims not dissimilar to those of Bar-paneled bowls are characteristic of Black-on-white wares, while the heavier, more upright rims of Standard band bowls are typical of Biscuit B, it seemed that the former must be the older. This belief was strengthened by the strong resemblance between the multiple-line framing of the Biscuit A Standard bands and the similar framing of the Standard band in Biscuit B; and by the fact that the single framer and heavy paneling bar of the Bar-paneled bands are very rare in Biscuit B. Lastly, the elaborateness of the Bar-paneled patterns seemed to be more in keeping with Black-on-white traditions than with those of Biscuit B.[1]

The sherds from the tests were then examined. Fragments, of course, do not often permit recognition of whole designs, but they are satisfactory for observations on rim shape and framing systems, The material definitely proved plain and thin flaring rims to be the earlier type, unthinned flaring later, and semi-standing latest. And the single framer was found to predominate in the older strata.

What may be the genetic relation between the two groups of bowls is uncertain. That they are closely allied is proved by such strong similarities as the whirling movement of the complete patterns, the division of the band into three panels, the

[1]A correlation between rim shape and decorative system brings out the fact that of the outcurved rims 46% have the single framing line, 54% multiple framers. The rims with single framers tend strongly to be of the flaring subtype; those with multiple framers run to the semi-standing. Of the plain rims 80% have single framers and only 20% multiple framers. Of all the sherds about 60% have single and 40% multiple framers.

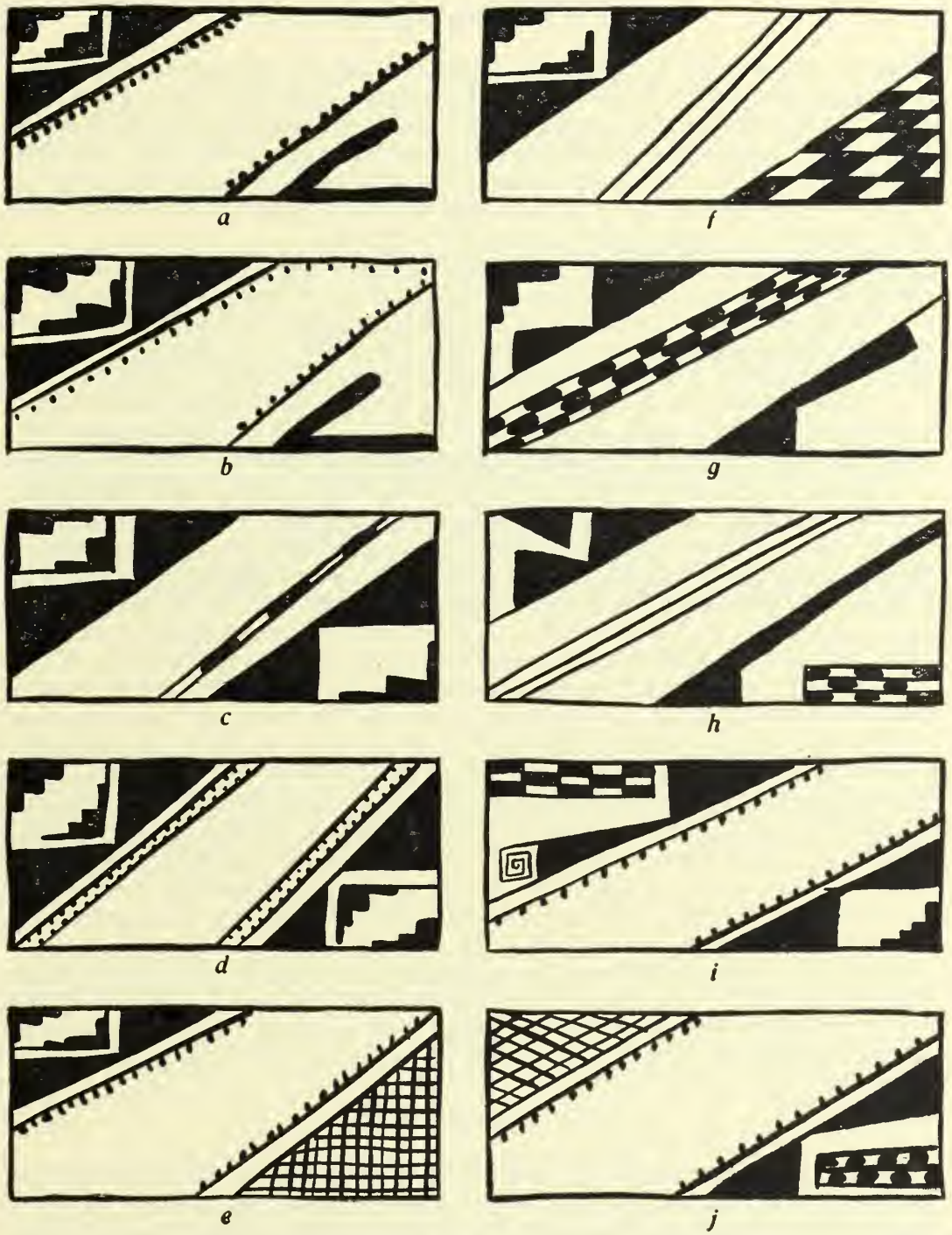


Fig. 37. Biscuit A. Panels from Standard bands. The drawings are diagrammatic in that the panels have been made rectangular, and the painted figures somewhat regularized for comparison of their structure. For the appearance of whole patterns of this style see figs. 34 and 35.

oblique subdivision of the panels into three fields, and the cutting off and painting black of the corners in the "a" field. I believe that the Standard band is an outgrowth of the Bar-paneled band and that were our material more abundant one might be able to establish a series showing all stages in the transition. It should be considered, however, that the postulated transition may not have taken place at Pecos. The local potters may well have followed styles developed elsewhere. If this were so all the steps might not be represented at Pecos.

AWANYU BANDS. Area covered. Bowl interior from ½ inch below rim in straight-rimmed pieces; or from just below outcurve in pieces with flaring rim.

Framing. In three cases (figs. 34, *f*; 38 *a*, *b*) identical with framing of Standard band (i.e. heavy outer, two or three lighter inner lines); one case (fig. 34, *g*) same as Bar-paneled band (i.e. single heavy outer framer).

Layout. Varies: in two cases (fig. 38, *a*, *b*) the *awanyu* figures rise from the lower banding line and bend to the left; in one (fig. 34, *g*) they are paired in panels; in one (fig. 34, *f*) their bodies lie against the upper banding line.

Awanyu. This very interesting figure is strictly confined to Biscuit ware, although anologous devices which may perhaps be collaterally ancestral to it are found on certain Black-on-white vessels (see fig. 14, *c*). *Awanyus* occur in so many forms as to render description difficult. The one common feature is a triangle with five pointed appendages. This I call, for want of a better term, the head. The head may be mounted on a stalk;[1] may be connected directly or by a stalk to a figure of substantial size, which I call the body; or may appear without stalk or body.

Among the thirty-five Pecos Biscuit A bowls sufficiently perfect for the decoration to be made out, *awanyus* occur in four cases, or a little over 11%. Examination of the sherd collection, however, shows that *awanyus* were actually much rarer than this. They are all incorporated in conventional band layouts. One, for example, is in the manner of the Bar-paneled bands and runs true to that type both in framing and in paneling (fig. 34, *g*); three pairs of *awanyu* heads on interlocking black stalks occupy the panels. Another (fig. 34, *f*) has thin-line inner framers like those of the Standard bands and the bodies of the three *awanyus* are nothing more nor less than the regular "a" figures of the Standard band. The other two *awanyu* patterns also have multiple framing; one (fig. 38, *a*) has plain rim; the other (fig. 38, *b*) semi-standing rim with ticked edge. The *awanyu* heads in both cases are mounted on barred stalks bent to the left. As here reproduced (i.e. in band form) they are sequent, but as seen looking into the bowl they have a sinistrally whirling appearance, which perhaps gave rise to the true whirling arrangement of some Biscuit B *awanyus* (see fig. 56, *c*).[2]

PENDENT TRIANGLE PATTERNS

These are confined to small, plain rimmed bowls. We have but one complete specimen (fig. 40, *a*), but the sherds indicate that they were not uncommon. Three large hatched triangles, each enclosed by a heavy line, depend from the rim. There

[1] I discard the word arm, used in a former publication (Kidder, 1915, p. 432).

[2] Discussion of the possible meaning of the *awanyu* will be found on p. 124.

is no framing, the decoration merely ending at the edge of the bowl. A peculiar creature, presumably a butterfly, appears between two of the triangles. The pendent hatched triangle is also associated with life figures in the decoration of certain small Biscuit B bowls from Pecos (see fig. 72); the same phenomenon has been noted from the Pajarito Plateau.[1]

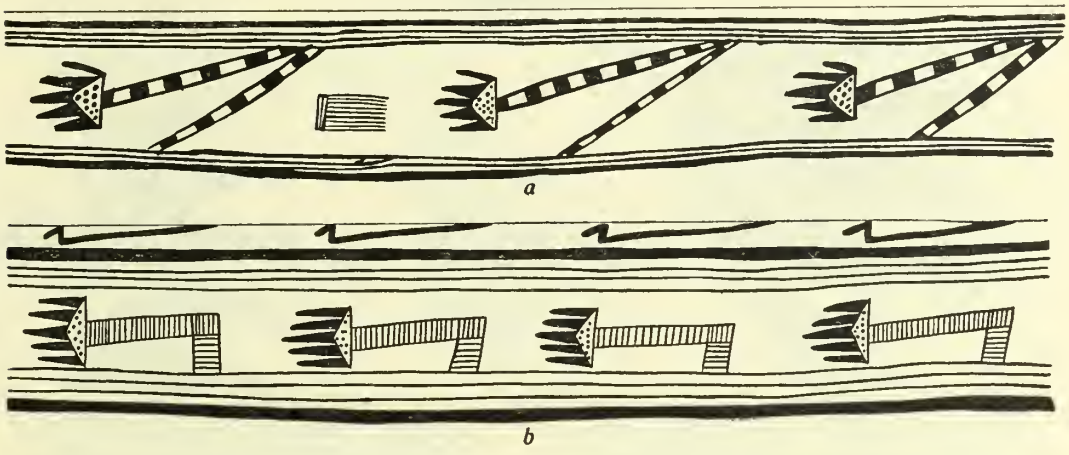


Fig. 38. Biscuit A. *Awanyu* bands. Diameters of bowls about 14 inches.

QUADRATE PATTERNS

Obviously this (fig. 40, *b*) is closely allied to the pendent arrangement of hatched triangles just described, but the heavy lines which border the triangles in the former are here so disposed as to form a square space in the bottom of the bowl. The sherds fail to show any similar layout, nor is it found on other Pecos wares later than Black-on-white.

THE ELEMENTS OF BISCUIT A DECORATION

Although it might perhaps be more logical to discuss the units which go to make up designs before considering the complete patterns, it was thought that the following details would be more readily understandable if the reader had in mind the gross anatomy, so to speak, of the decoration. Biscuit A designs are almost entirely composed of lines, dots and filled angles combined as to produce broad effects. Individual figures, such as keys, triangles, terraces etc., do not constitute the leading motives but serve, when present, to fill minor spaces in larger arrangements.

Lines are of much importance: in sets of two or three as framers of Standard bands; as hatching and cross-hatching for fills; in cribbing (see below); and in paralleling the hypothenuses of triangular fields. They are characteristically heavy and are set far apart, are wavering, irregularly spaced, and of uneven width. The narrower lines were always drawn with long, trailing strokes of what would appear

[1] Kidder, 1915, p. 431.

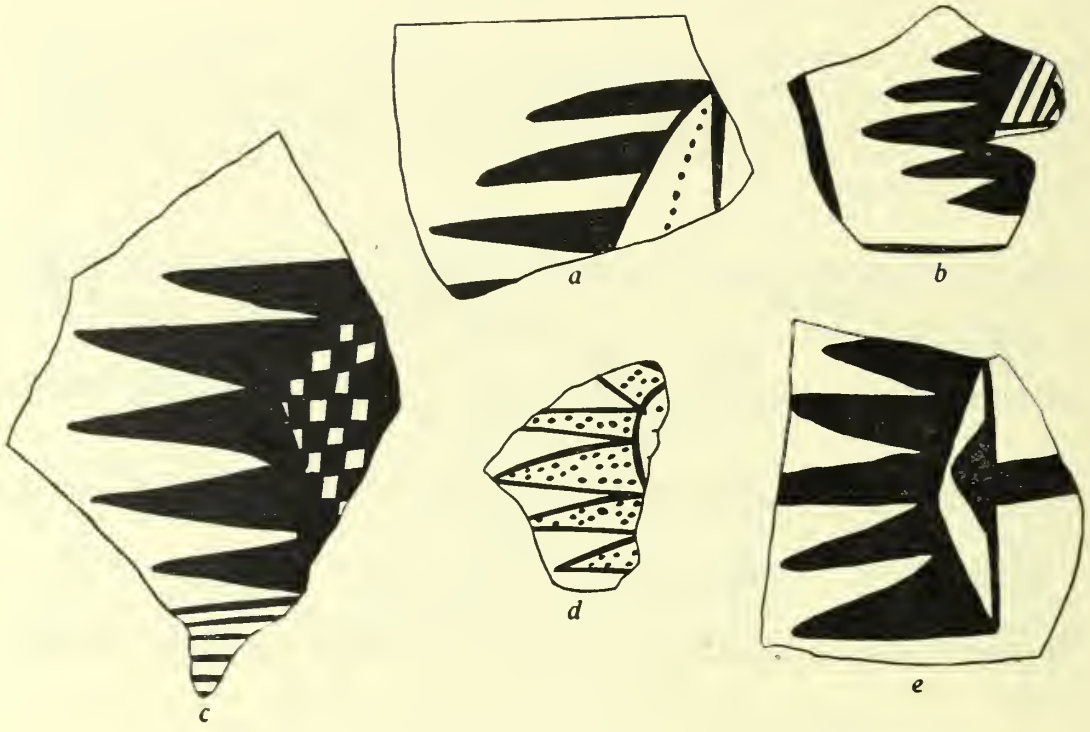


Fig. 39. Biscuit A. *Awanyu* heads from sherds. Length of sherd *a*, 5½ inches.

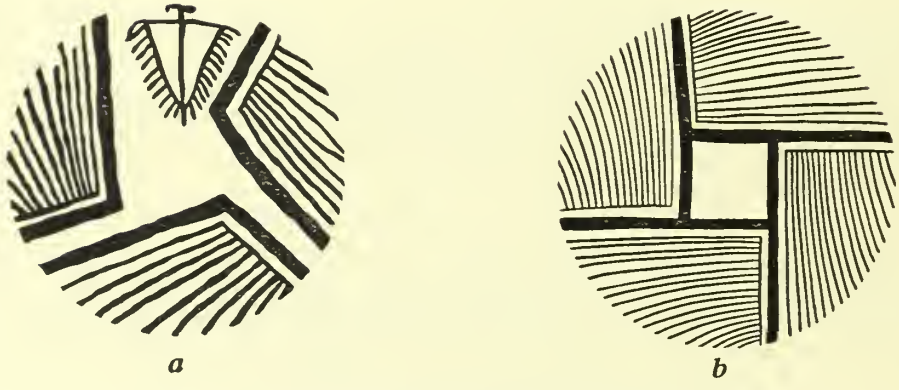


Fig. 40. Biscuit B. *a:* Bowl with pendent triangle pattern. *b:* Bowl with quadrate pattern. Diameter of *a*, 8½ inches.

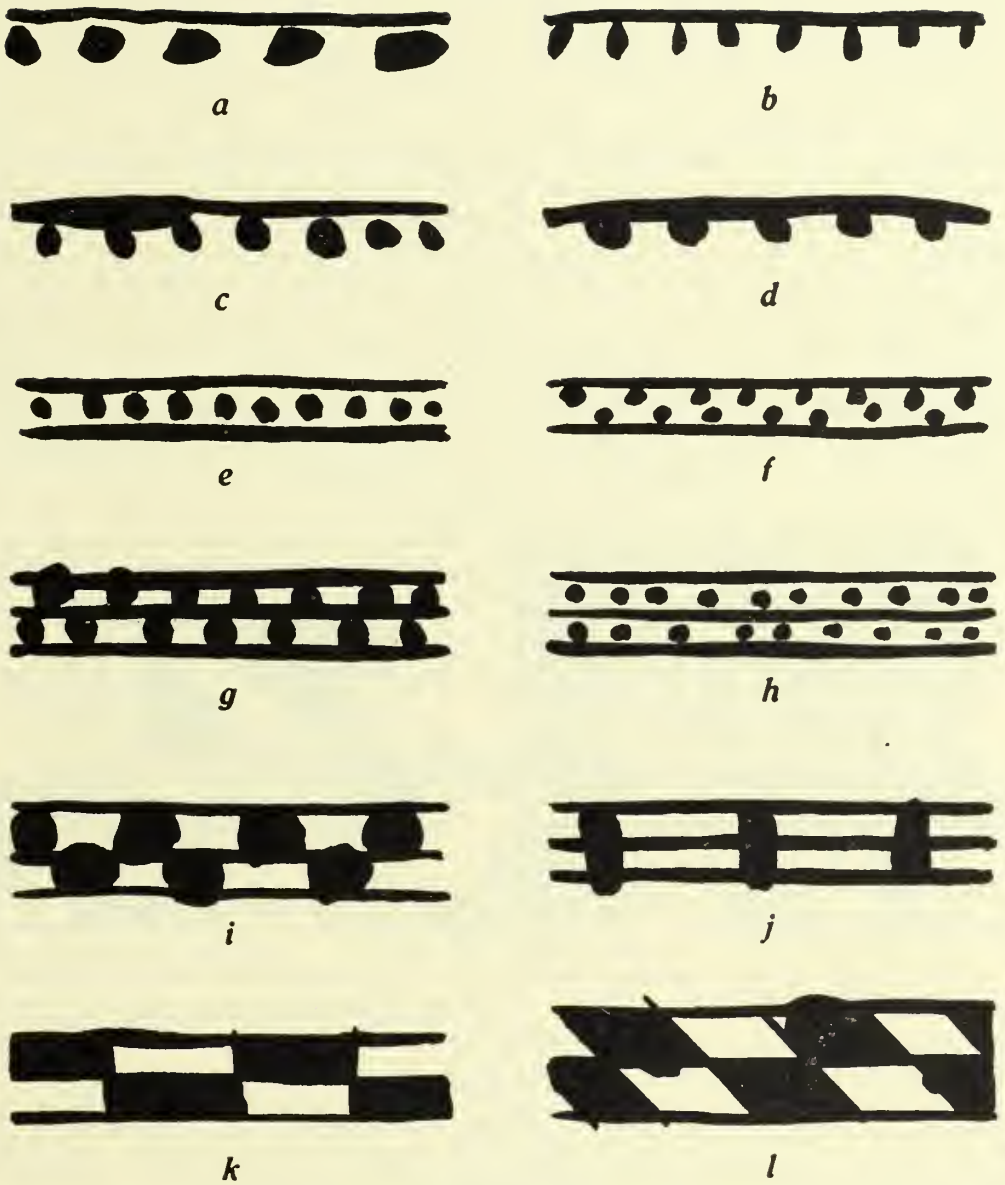


Fig. 41. Biscuit A. Dotted and checkerboarded lines. The drawings are accurate copies to show the slipshod brushwork of the originals. Actual size.

to have been a rather limp brush; even broad framers and paneling bars were usually painted with a single movement rather than being first outlined and then filled, as in the work of more meticulous schools.

Dotting and ticking along lines or between parallel lines is abundant (see fig. 41). Here again hasty, careless brushwork is evident, the dots being amorphous, ill-spaced, and hanging only haphazardly to their base-lines. Very large dots arranged between parallel lines sometimes produce a pseudo-checkerboarding (fig. 41, *i*). True *checkerboarding* occurs, usually in narrow, two or three-line strips (fig. 41, *k*, *l*). *Hatching*, although much less used than in Black-on-white, appears in the pendent triangle patterns (fig. 40, *a*), in small triangles (fig. 27), and in rectangles (fig. 24, *a*, *b*, *d*); its edgings are of the same weight as the hachure; the hachure itself is stragglingly drawn and broadly spaced. Cross-hatching is very uncommon (fig. 33).

A characteristic use of the line in Biscuit A may be called *cribbing*[1]. It is the reduction in area of a rectangular field by drawing lines parallel to its longer sides, then parallel to its ends within the first set, and so on (fig. 42). As a rule the process is continued until the field is full (fig. 42, *a*); less commonly the cribbing merely reduces the field, which is finally filled with another decoration (fig. 42, *b*).

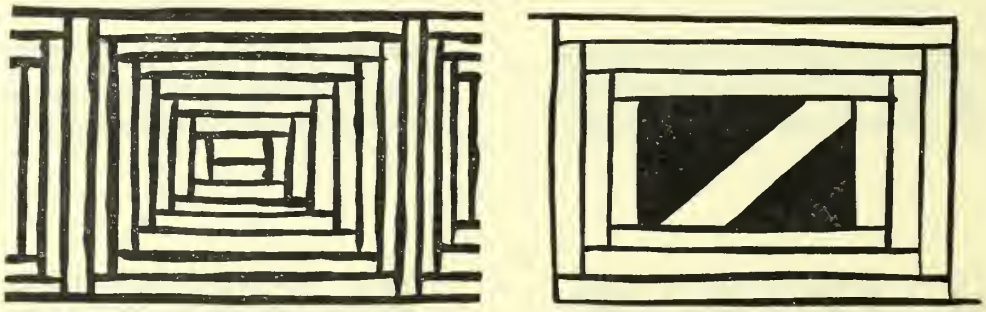


Fig. 42. Biscuit A. Cribbing to fill or reduce rectangular areas. About natural size.

The key figure, as intimated above, is of less importance than in Black-on-white. But though its role be modest, it appears with considerable regularity in two well-defined and characteristic forms, both used to round out or complete larger arrangements. These may be called the Filling key and the Thoroughbred key.

The *Filling key* is so named because it is used in opposed pairs to fill the rectangular spaces reserved from the triangular "a" fields in the panels of Standard band patterns, more rarely and in less typical form in the same field of Bar-paneled bands. Characteristic examples from Standard bands are copied in fig. 43, *a*, *b;* that at *c* is from a Bar-paneled band. They are normally three-stepped, the middle step usually being the largest. Their rendition is coarse. One of each pair of keys is usually backed into a corner of the "a" field rectangle (see fig. 37, *a-g*, upper left key

[1]Described as "cut down rectangle" in Kidder, 1915, p. 429, pl. XIX, 11, 12; a similar device may be used to fill or reduce a triangular field, but this seems not to occur in either Biscuit A or B.

in each case). The opposing key of each pair is either on a stalk (fig. 37, *d*, *f*) or is placed in the angle of a bent line within the rectangle (see fig. 43, *a*, *b*). A key would lack definiteness if placed directly against solid black as in the lower right corner of the reserved rectangle in an "a" field or the upper left corner of the rectangle in a "b" field. A case of this very sort appears (an "a" field in fig. 34, *b*). Another occurs in a "b" field in fig. 35, *a* where the key was, obviously through inadvertency, outlined in such a corner, the artist presumably thinking at the moment that she was putting it into the corresponding angle of an "a" field. On noticing her mistake she refrained from blacking in the key. Much information as to the psychology of design and canons of taste may be had through study of errors and their correction.

"*Thoroughbred*" *key.* The name is a catch-word, perhaps not inappropriate because of the slender, clean cut rendition of this three-stepped key (see fig. 44), whose whole conception is radically different from that of the heavy, lumpish filling key. It occurs in opposed pairs and is always used in strip designs forming parts of Bar-paneled patterns. Its stance is regularly left oblique, its stalk thin and its base triangular.

There should be noted the striking lack in Biscuit A of opposed hatched and black keys and hatched and black triangular or dentate figures. All these are most abundant in local Black-on-white decoration. Another figure characteristic of Black-on-white which is almost absent from Biscuit A (recorded from a few sherds only) is the triangle with ticked face (see fig. 12). Possibly the ticked or dotted line paralleling the hypothenuse of the "a" and "b" fields in Standard bands may represent a survival of the tick-faced triangle of earlier times; as also may the treatment of butterfly wings (see fig. 47).

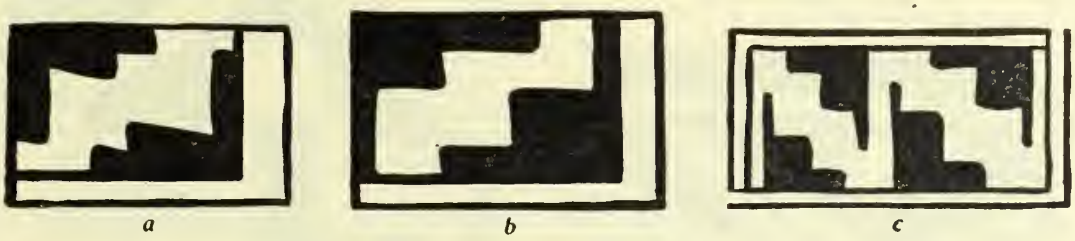


Fig. 43. Biscuit A. Filling keys. Used in pairs to fill rectangular areas. About two-thirds actual size.

Geometric devices with a Black-on-white flavor are rare. Four examples appear in fig. 45. That at *a* is the only case of curvilinear drawing noted in the Biscuit A collection; Black-on-white examples may be found in fig. 19. In *b* is an oblique arrangement of dots between parallel lines which occurs very commonly in Pecos Black-on-white (fig. 5) and also in the Black-on-white of the Mesa Verde. Isosceles triangular spaces reduced by corner-cutting (*c*) or interior terracing (*d*) are as rare in Biscuit, either A or B, as they are abundant in Black-on-white. The two sherds reproduced seem to be from Bar-paneled patterns with X subdivision.

Vegetal representations. There are but three instances, all illustrated in fig. 46; they evidently depict the same general sort of thing, perhaps the spruce twigs which

play so important a part in modern Pueblo ceremonies. The sherds give no indication of the position of the drawings in the design of the bowl. The use of plant motives is of extreme rarity in prehistoric Pueblo pottery decoration.

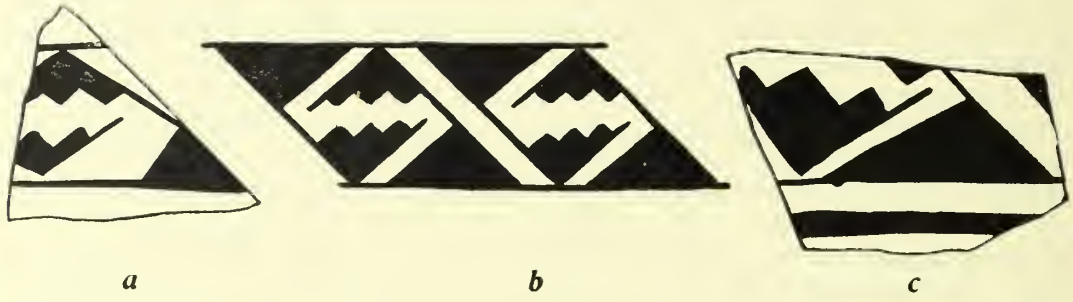


Fig. 44. Biscuit A. "Thoroughbred" key used in opposed pairs in narrow strip-like zones. About one-half actual size.

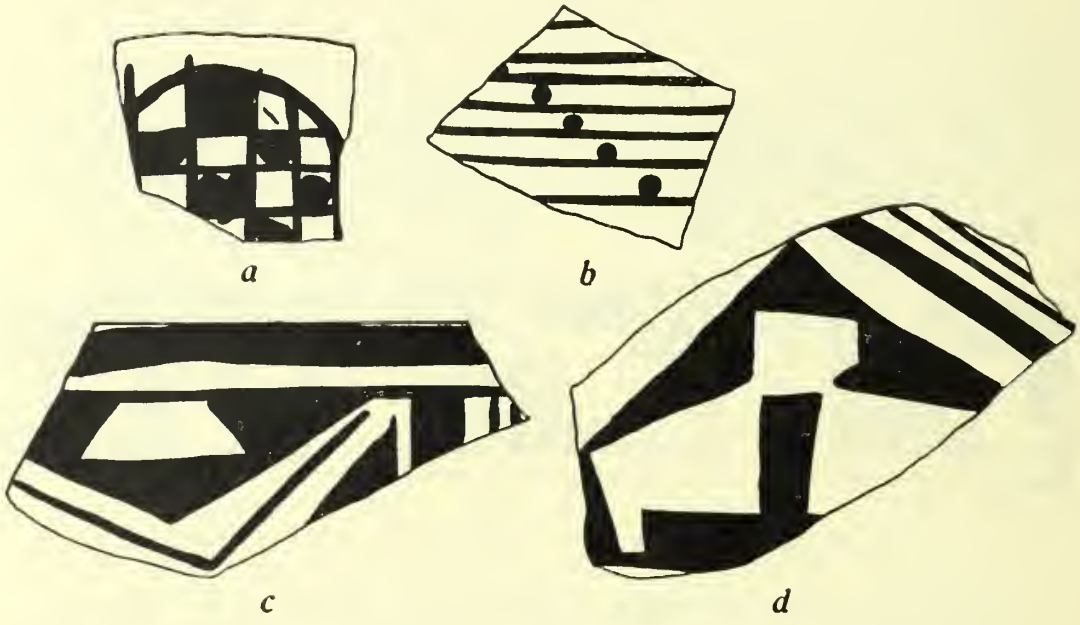


Fig. 45. Biscuit A. Sherds with unusual decorations reminiscent of Black-on-white. Length of *d*, 5 inches.

Butterflies. In so identifying the creatures illustrated in fig. 47 I may be in error. It is possible that they represent birds, the crooked head being similar to the heads of certain undoubted birds of Black-on-white ware (cf. fig. 18). But birds at Pecos are usually represented in profile, while the butterfly in other parts of the Southwest is normally spread out, as here[1]. In any case the figures are interesting

[1] See Fewkes, 1898, pl. CXXV; 1909, fig. 1; 1910, fig. 60.

in that they combine perfectly typical Biscuit A units in such a way as to produce a simple and conventional life motive. I say conventional advisedly. I do not mean conventionalized. The latter word, in anthropological parlance, generally implies the simplification of a naturalistic representation through the sloughing off of unessential parts by force of repeated copying, the end result being more or less geometric. There is no reason for supposing that this process was responsible for producing the figures in question, for no more realistic depictions of butterflies are known from earlier horizons. There is no good evidence that conventionalization, in the above sense, ever took place in Southwestern ceramic art, and I believe, indeed, that the trend was in exactly the opposite direction, originally geometric figures becoming naturalized because of fancied resemblances to life forms. One of the large butterflies, (fig. 47, *d*) repeated four times forms the main decoration of a bowl of the multiple framer type (fig. 34, *d*). The other (fig. 47, *e*), is worked in peculiar fashion into a dual pattern framed and panelled in the manner of the Bar-paneled bands (fig. 33). The small one (fig. 47, *c*) is taken from a strip design in a Bar-paneled band pattern in which four butterflies are repeated (fig. 24, *e*). The other two small examples (fig. 47, *a*, *b*) are from sherds, so that one cannot determine what part they played in the decorative scheme. Much more crudely drawn than the foregoing, but like them in general layout, and in possessing fringed wings, is the interpolated figure in the small bowl with pendant triangles (fig. 40, *a*).

Fig. 46. Biscuit A. Vegetal forms. Such depictions are extremely rare in all prehistoric Pueblo ceramic decoration. These three specimens were the only ones found during examination of many thousand Biscuit A sherds. Height of *a*, 3 inches.

Feather (?) *symbols.* A unique sherd is illustrated at *a* in fig. 48. The representation is without much question the tail feathers of the eagle[1]. What may also possibly be feathers appear in *b* in the same figure.

Birds are less common in Biscuit A than in B, but are of closely similar forms. The sherd shown in fig. 48, *c* has the bill, with both upper and lower mandibles

[1] See Chapman, 1927.

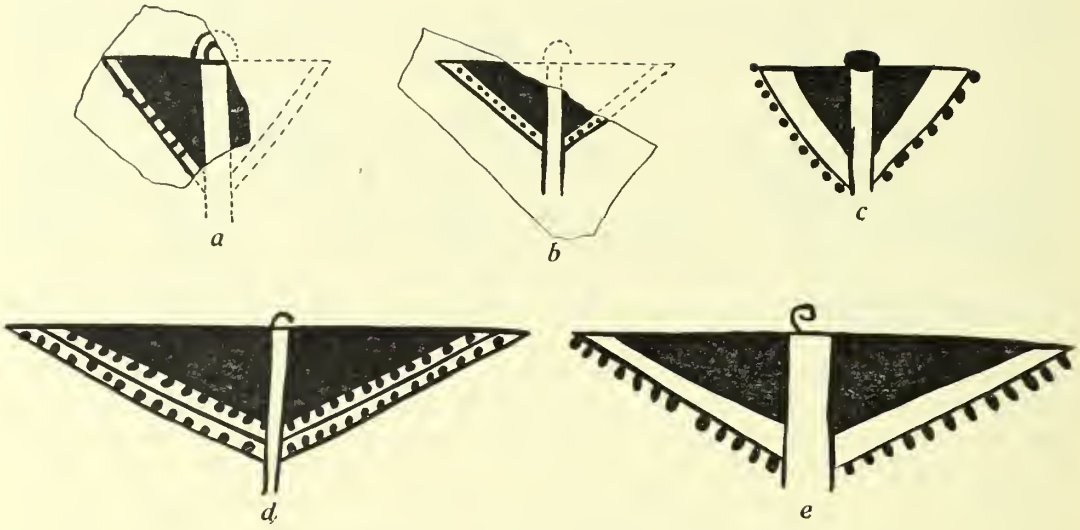


Fig. 47. Biscuit A. Butterflies (?). About one-half actual size.

Fig. 48. Biscuit A. *a:* Possible representation of eagle tail-feathers. *b:* Bird-tail (?). *c:* Bird pecking seeds. Height of *a*, 5 inches.

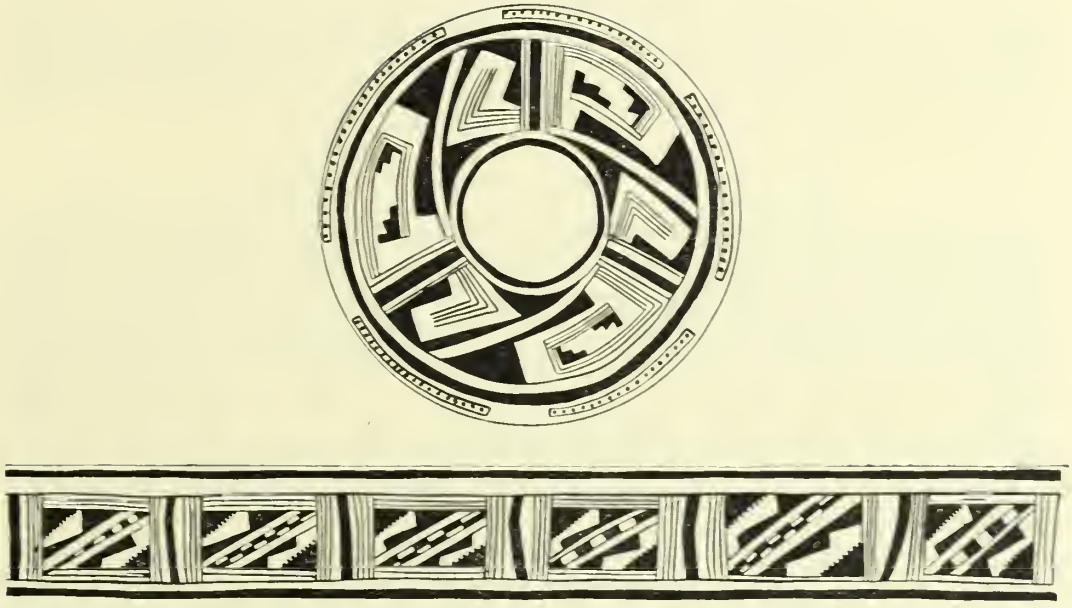


Fig. 49. Biscuit A (?). Bowl which accords closely with Biscuit A standards, both technical and decorative, but which bears exterior decoration (shown extended). Diameter, 12 inches.

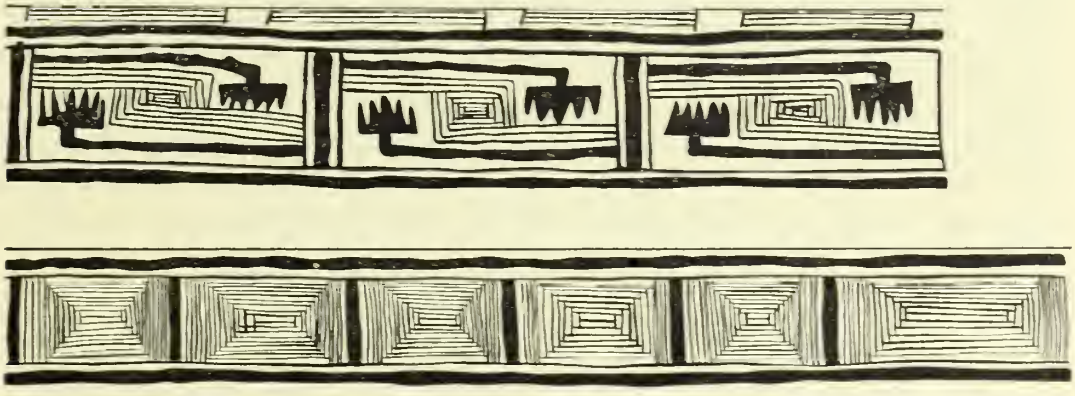


Fig. 50. Biscuit A (?). Bowl which presumably should be classed with Biscuit A in spite of its exterior decoration (interior above, exterior below). Diameter, 9¼ inches.

represented, a trait which serves to differentiate most Biscuit birds from the single-billed Black-on-white birds. It was evidently depicted with raised wing, which was not done in Pecos Black-on-white. And it conforms to a common Biscuit B type in that it is depicted as pecking at a group of seeds (cf. fig. 82, *a*, *c*). The only other bird recovered is interpolated in a Standard band pattern (fig. 35, *a*).

BISCUIT A BOWLS WITH EXTERIOR DECORATION

The readiest criterion for distinguishing Biscuit A from Biscuit B bowls is that the former are decorated only within, the latter both within and without. However, as was said above, certain specimens indicate that the exterior of a Biscuit A bowl was occasionally slipped and painted. One of these (fig. 49) bears on the interior a Bar-paneled pattern framed with a single heavy line, paneled conventionally, and typically elaborated in every respect save that the "a" and "b" fields are so large as to have caused the entire elimination of the central or "c" field. The exterior band is framed and paneled in the Bar-panel manner. The bowl's rim is thinned and flaring, bears a face-decoration, and its edge is not ticked; these are all features characteristic of Biscuit A.

The second piece (fig. 50) is obviously analogous to the Biscuit A *awanyu* bowl shown in fig. 34, *g*. Framing and paneling are early Biscuit A in style, and the subdivision of the panels is similar to that of Biscuit A "jogged line" Bar-paneled patterns (cf. fig. 27). The cribbed panels of the exterior band are duplicated in fig. 24, *c*. The rim is of the unthinned, flaring class. Its edge is ticked. Only in the latter respect does it fail to accord with the traditions of the Bar-paneled sub-class of Biscuit A.

Both these bowls have strong Biscuit A affiliations, and their likeness is indeed most strong to the earlier phase of Biscuit A. There is possibility that they represent conscious archaism during Biscuit B times, but the *awanyu* bowl was found in a grave (No. 1645)which also contained a Glaze I yellow vessel; the other with Skel. 218 on subsoil in a part of the cemetery where the other deep interments were all of early (Glaze I-II) date. There is accordingly very little doubt that they belonged to the Biscuit A period. A careful check of the sherds from the tests shows that in material deposited well before the definite shift to exterior decoration, which marks the opening of Biscuit B, there is an occasional fragment slipped and painted outside. Such pieces are, however, very rare; they never reach, among the total sherds, a percentage comparable to that of the two pieces just described among the whole bowls.

BISCUIT B

Biscuit B, the later phase of Biscuit ware, differs most radically from the run of Biscuit A in that the exteriors of the bowls are slipped and decorated. There are also differences in color, in design, and in the shapes of the vessels, particularly in the form of the rim. Thus, as has already been remarked, there is seldom difficulty in identifying the few Biscuit A pieces which bear exterior embellishment. And no Biscuit B bowl, judging by criteria of form and ornament, was ever left with unslipped exterior.[1]

Technology

Paste. Indistinguishable from that of Biscuit A in texture, fracture, softness and lack of gross tempering material. Differs from Biscuit A in greater range of color. The grays of Biscuit A, from almost white to very dark, are represented and there are also many pieces of various yellowish tones, none of which appear in Biscuit A. Another difference is that the darkening of sherds toward the exterior, a common trait in A, seldom occurs in B. Seen in section, Biscuit B is sometimes uniformly gray or yellowish from surface to surface; but much more often it shows a darker central streak, which is very rarely observed in A.

Slip. Applied to entire interior and exterior surfaces of bowls. The whole exterior of the olla was slipped, as well as the inside of the rim as far as, or even a little below, its junction with the body. Some ollas are also slipped within; our only complete specimen (fig. 57, *d*) is so treated, and three sherds show similar handling.

The slip is a relatively thin and seldom crackled coat. Its finish is generally less good than in Biscuit A, well smoothed, "slick" examples being rare. When, as is not often the case, it is of different color from the paste immediately below, it can readily be seen in section with the naked eye. It is, however, usually of identically the same shade as the paste, and were it not for the fact that it occasionally chips off in minute flakes, thus evidencing its addition as a definite layer, one might

[1]The literature of Biscuit B is fairly extensive. Hewett (1906, pl. XV) figures several pieces; in a later publication (1908, pl. XV and pp. 90-92) he discusses the symbolism of the decoration. The present writer (1915, pp. 427-436) named the ware and made a preliminary analysis of the design-system of collections from the Pajarito; a brief description of Pecos Biscuit appeared two years later (Kidder, M. A. and A.V., 1917). Mrs. Wilson (1918) considers the *awanyu* and illustrates a number of specimens from Otowi. Jeancon (1923) provides much information and many good pictures in his report on the excavation of Poshuouinge on the Chama. Collections of Biscuit B are in the following institutions: Northwestern University, Cole collection from sites on the Pajarito and at Ojo Caliente; U. S. National Museum, Jeacon collection from Poshuouinge, Hewett collection from the Pajarito; New Mexico State Museum, very large and important collections by Hewett and others from the Pajarito, Ojo Caliente, Jemez valley and elsewhere and representative lot from Pecos; Laboratory of Anthropology, the fine Wilson collection from Otowi and very large and valuable Mera sherd collection from the entire area; Southwest Museum, small lot from Puyé; Peabody Museum, small lot from Tuyonyi and Frijolito; American Museum of Natural History, Nelson collection from Galisteo Basin and region of Cochiti and important collection of sherds from many sites; Department of Archaeology, Andover, the Pecos collection and sherds from a number of other sites.

suspect that the surface had been "self-finished" by moistening the paste and rubbing it with a smoothing stone. The generally close similarity in color between slip and immediately underlying paste indicates that the same clay was used for both. In this Biscuit B differs from A, the latter bearing a slip of distinctly lighter color than the paste, a continuation, perhaps, of the Black-on-white tradition of masking dark base-clays with white slip.

The slip color, as has just been said, commonly coincides with that of the paste, and the paste, as was stated in its description, varies from almost pure white to a decidedly yellowish cast. The range of color is here stressed because it is linked, as will subsequently be shown, with certain variations in vessel shape and in decoration.

Pigment. Not distinguishable from that of Biscuit A. The "Hawley tests" prove it to be also of vegetable origin.

Vessel Shapes

The Pecos potters were markedly conservative and unenterprising in the matter of vessel shapes. Even in Black-on-white times, when in other regions there were being turned out pots of many different forms, the local range was severely limited. And subsequent to the Black-on-white practically nothing was produced except bowls and ollas. Even ollas seem to be lacking from Biscuit A. In Biscuit B there is more diversification of bowl form and the olla appears; but from Pecos, at least, I have never seen even a sherd from a ladle, or pitcher, or small jar.

BOWLS

In the case of Biscuit A bowls it was possible to make a preliminary classification on the basis of size. Biscuit B bowls cannot usefully be grouped in this way for while there is a recognizable class of small bowls with plain rim, there are also many pieces with modified rim which are also small. It has seemed best, therefore, to base the present classification upon the more significant criterion of rim form, but here one is again in difficulties, as there is so imperceptible a gradation between the different sorts of modified rims that no definite classes can be established.

BOWLS WITH PLAIN RIM (figs. 51, *b, d;* 56, *a, c*) are shaped much like the small plain-rimmed bowls of Biscuit A. The Biscuit B examples are also small; the average diameter of eight pieces is 8½ inches, the smallest measuring 7½, the largest 10½ inches. They are relatively shallow, the diameter-depth index being around .37. They hold from 1¾ to 2¼ dry quarts (2 to 2.5 litres). The sides are rounded and draw inward to the orifice, so that the point of greatest diameter is well below and outward from the rim. The rim (fig. 52, *a*) continues the curve of the side to terminate in a rounded ege.

BOWLS WITH MODIFIED RIM (figs. 51, *a, c;* 55; 56, *b, d*) are commoner than plain rimmed bowls, the sherd count showing about 75% of the former to 25% of the latter. They are also much more variable in size. No valid average can be expressed as there is an almost perfect gradation between pieces of 8-inch diameter and capacity of 2 quarts (2.2 litres) to ones measuring 13 inches and holding 7

quarts (7.7 litres). Only two of our whole pieces are more than 13 inches; one is 15 inches and the other is a monstrous piece 17½ inches across with a capacity of 15 quarts or about 16½ litres (fig. 56, *left*). From the sherds it would seem that while this extreme size was seldom obtained, there were a good many examples of 14- and 15-inch diameter. These for some reason failed to find their way into graves, and so be preserved entire.

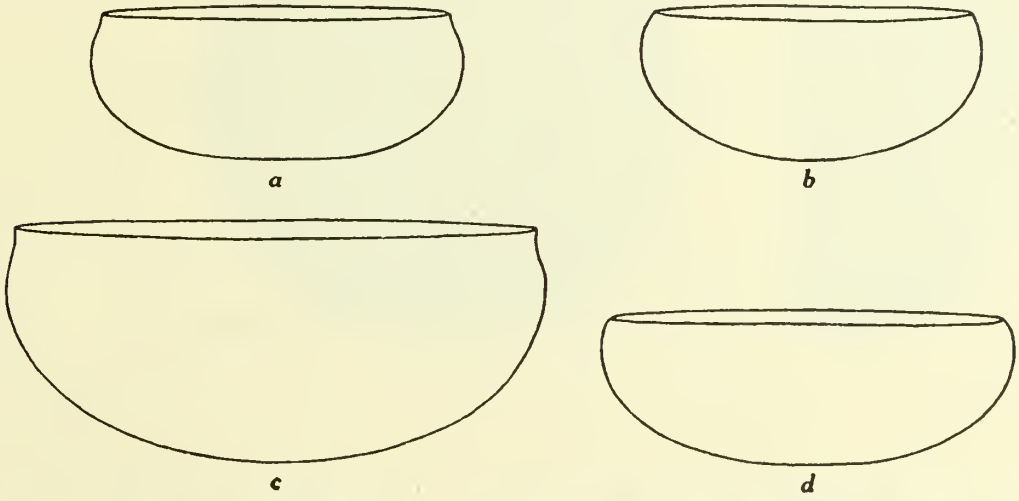


Fig. 51. Biscuit B. Outlines of typical bowls. *a, c:* Bowls with modified rim. *b, d:* Bowls with plain rim. Diameter of bowl *c*, 13 inches.

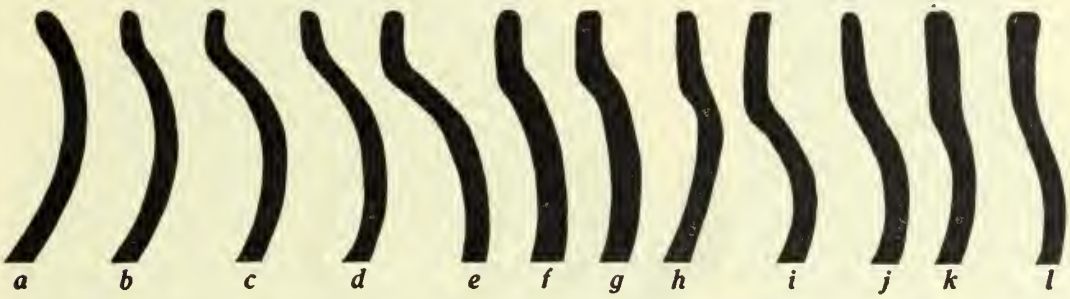


Fig. 52. Biscuit B. Bowl rims. There is progressive straightening and heightening of the rim from early to late. Height of sections, 2½ inches.

Diameter-depth index, like size, is variable; extremes are .30 to .48. The average is around .45, which shows the run of the pieces to be relatively deeper than Biscuit B plain rimmed bowls, and both small and large Biscuit A bowls. The point of greatest diameter lies, as in Biscuit A, somewhat below the rim.

A series of typical rim-sections appears in fig. 52, *b-l*. It will be seen that the noticeably flaring rim of Biscuit A (see fig. 22, *e-h*) is not found in Biscuit B. Modified rims run from semi-standing with very slight outcurve (fig. 52, *b, c*) to truly vertical (fig. 52, *f-l*). The latter are the most abundant. They differ from each other, as can

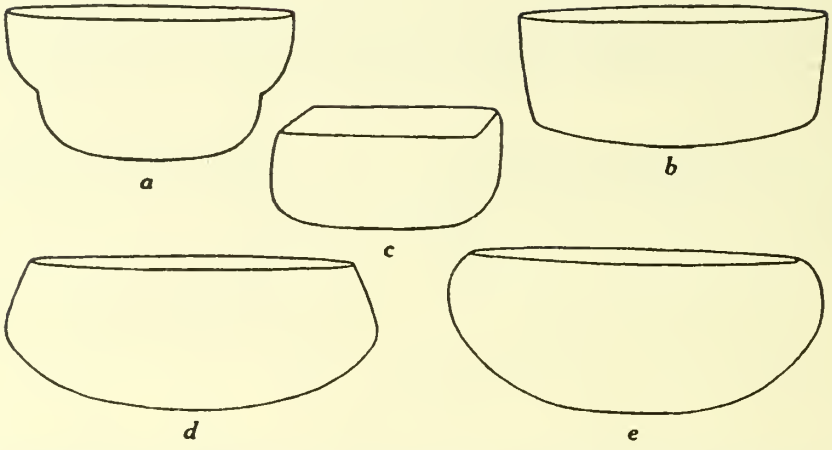


Fig. 53. Biscuit B. Outlines of bowls of unusual shape. Diameter of bowl *e*, 9½ inches.

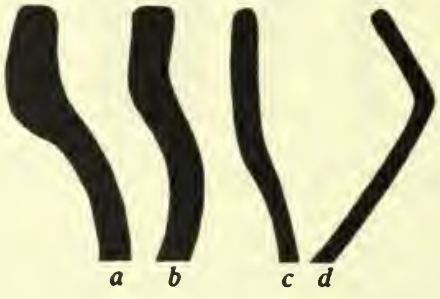


Fig. 54. Biscuit B. Unusual forms of the bowl rim. Height of sections, 2½ inches.

Fig. 55. Biscuit B. *Left:* Unusually large bowl; *Awanyu* band interior, Standard band exterior. *Right:* Bowl of normal size; Standard band on both interior and exterior. Diameter of large bowl, 17 inches.

be seen in the illustration, in height, in straightness, and in the degree of angle with the vessel wall. The lowest rims tend to be round edged (fig. 52, *b-e*), the taller ones to terminate more flatly (*g-l*). Very seldom is there any thickening.

Examination of the whole bowls raises the suspicion that rim form and slip color are correlated, vessels with plain rims and low standing rims being on the average a lighter gray than ones with medium height rims, while those with tall rims are usually of yellowish cast. Study of the much more abundant sherd material confirms the relationship, for any large series of Biscuit B fragments, graded according to height of rim, is found to exhibit an equally consistant change from clear light gray, through darker grays, to distinctly yellowish gray. As there is no reason for supposing that the shape of the rim should influence or be influenced by the color of the bowl of which it forms part, it is fair to infer that these gradual and consistent shifts reflect the passage of time. Biscuit A is, on the average, distinctly lower rimmed and grayer than B; therefore the low-rimmed gray end of the B series should theoretically be the younger. The evidence of decoration points the same way; and the stratigraphic material definitely settles the matter. Biscuit B from the older strata running strongly to gray and to low rims, sherds from the higher levels being yellowish and tall rimmed.

"SALT DISH" BOWLS (fig. 57, *e, f*). Six bowls with modified rim, from 9½ to 12¼ inches in diameter, have attached to the exterior of the rim a small cup-like appendage. In other respects the bowls are in no way unusual. In three cases the little cups are of symmetrical form (fig. 57, *f*). In the other three specimens the cups are elongated to the left, the narrowing portion being pierced vertically; in each of these three cases the opposite side of the bowl bears a heavy lug also vertically pierced (fig. 57, *e*). The holes in cup and lug are apparently for the reception of a cord bail. The purpose of the little receptacles is problematical; the term "salt-dish" is merely a convenient guesswork designation used in the field-notes.

The six specimens represent about 12% of all our complete Biscuit B bowls, a figure which seems entirely too high, for we found only three or four "salt-dish" sherds among the many thousand fragments examined during the excavations. Can it be that such vessels were partciularly favored for mortuary service? They are not restricted to Pecos: Hewett found one on the Pajarito (probably at Otowi) of which I have seen a photograph, it has neither perforation of the "salt-dish" nor an opposite lug; and Jeancon recovered one of the hole-and-lug type at Poshuouinge, it came from a room which contained ceremonial material[1].

BOWLS OF UNUSUAL SHAPE. There are two or three bowls whose plain rims turn rather sharply inward and thus somewhat restrict the orifice (fig. 53, *e*). A single bowl (fig. 53, *d*) approaches in form the Pajaritan large mouthed Biscuit B small jar.[2]

In fig. 54 are shown sections of rim sherds emanating from bowls which depart in one way or another from the normal. The thickened rim (*a*) is very uncommon, as are such heavy pieces as *b; c* approaches the high standing form of certain Modern-painted bowl rims (cf. fig. 85.); *d* is not unlike the rims of Glaze III olla-bowls.

[1] Jeancon, 1923, pl. 45, f.
[2] Kidder, 1915, pl. XVII, 11.

We have fragments of a small square bowl, 4½ inches in diameter by 2 inches deep (fig. 53, *c*). Its form suggests the so-called "prayermeal" bowls of later times. Its interior pattern (fig. 77, *a*) is apparently an adaptation of the *awanyu* motif, but the dotted points are atypical. Opposed triangles which make up an exterior band pattern are not characteristic of Biscuit ware; and the exterior bottom was decorated (worn and broken beyond legibility). All these factors smack of ceremonialism. Another eccentric piece is a small straight-sided bowl, 7¾ inches in diameter, 3¼ inches deep (figs. 53, *b*; 57, *b*). Its interior is roughly finished and unslipped. The exterior bears a herringbone band pattern. Finally, there is a double-curve bowl, 7 inches in diameter, 3¾ inches deep (figs. 53, *a*; 57, *c*).

OLLAS

Biscuit B ollas were not commonly made at Pecos, their place having apparently been taken by water jars of Glaze ware. We have only one complete example (fig. 57, *d*) and relatively few sherds. Such fragments as were found indicate, however, that our whole specimen is of typical form. It is characterized, as the illustration shows, by low, vertical rim, angular shoulder, and wide flat bottom. Its dimensions are: height, 9¼ inches; diameter at shoulder, 14½ inches; orifice, 7¼ inches. Its capacity is 11½ dry quarts (12.7 litres). Such Biscuit B ollas as have been figured from other sites are closely similar to the one from Pecos.[1]

Decoration

Biscuit B bowls are decorated both within and without. The principal interior design covers the greater part or all of that surface; the exterior design all but the flattish and therefore normally invisible bottom. Minor decorations are applied to the rim, the edge of which is always marked, either with single ticks spaced about 1 inch apart, or with sets of several more closely placed ticks recurring at more or less regular intervals (see photographs, figs. 55, 56). Plain rims bear no further decoration, but the inner side of all standing rims is embellished with zigzags (fig. 70, *b*, *c*), "bird marks" (figs. 68, *b*; 83), or heavy oblique dashes (fig. 68, *a*). The somewhat more elaborate devices seen on flaring and semi-standing Biscuit A rims (cf. fig. 23) are only found on what seem to be the earliest Biscuit B specimens.

Ollas are decorated with a band which extends from the base of the rim to or slightly below the shoulder. On the underbody are occasionally sets of three short heavy, horizontal marks. The rim edge is ticked; its exterior is usually plain, but occasionally bears a "bird mark". The interior of the rim is always provided with a zigzag or with groups of oblique dashes like those on the interior of standing bowl rims.

The decoration, both of bowls and ollas, is noticeably more hasty and slapdash than that of Biscuit A. An occasional early piece is effectively painted, but one cannot escape the impression that Biscuit B is, at Pecos, a sadly decadent ware. There

[1] See Jeancon, 1923, pl. 47, *a*, *b*; Kidder, 1915, pl. XVI, 3, 4.

Fig. 56. Biscuit B. Small bowls. *a:* Pendent triangle pattern. *b:* Pendent triangle pattern with bird. *b′:* Standard band. *c: Awanyu. c′:* Pendent triangle. *d: Awanyu. d′:* Standard band. Bowls *b* and *d* are early specimens, possibly made during the Biscuit A period. Diameter of *d*, 9$\frac{3}{8}$ inches.

follows a classification of the patterns represented in the collection of whole, or nearly whole, specimens from Pecos:

Band patterns		71
Standard bands	54	
Zigzag bands	8	
Awanyu bands	5	
Unclassified bands	4	
Pendent patterns		10
Non-band *awanyus*		5
Aberrant patterns		6

BAND PATTERNS

STANDARD BANDS. As its name implies, the Standard band is the normal decorative pattern of Biscuit B, both bowls and ollas. It is often used on both interior and exterior of the same bowl, and it commonly appears on the exterior of pieces which bear pendent hatched triangles or *awanyus* as interior patterns. It is obviously related to the Standard band of Biscuit A, and as that ware is older than Biscuit B close comparative study of the pattern as it appears on these two classes of pottery may ultimately be expected to yield valuable data upon the progressive modifications of the design.

Area covered. Interior or exterior of bowls, body of ollas. When on the interior of a bowl its upper framer comes just below the standing portion of the rim, i.e. from ¾ to 1 inch or more (depending upon the dimensions of the rim) below the edge; its width is relatively less than that of the Standard band of Biscuit A, and it accordingly leaves a larger clear space in the bowl bottom. When used on bowl exteriors its upper framer is set about ½ inch below the edge of the rim, and therefore lies well above the interior upper framer; it usually carries so far down the vessel wall that in side view it nearly covers the entire visible exterior (see fig. 55).

Framing. Heavy top and bottom framers with one, two, or rarely three, narrower framers between them and the banding line; the inner framers and the banding line are of equal weight. The line break occurs on only one piece in the collection (figs. 73, *b*; 74, *b*).

Paneling. Three or four similar, often identical panels (there is but one case—fig. 74, *f*—of alternation of even moderately unlike panels). The panels are separated from each other by a narrow vertical open space left between the single engaged paneling line which normally terminates each panel. Unengaged paneling lines (as in fig. 65, *a*, *b*, *o*, *t*) are comparatively rare. Occasionally there are no paneling lines at all, the vertical ends of the paired figures reach, however, nearly to the opposite banding lines and so produce a paneled effect (see, for example, fig. 67, *d*).[1]

[1]In my original description of Biscuit B band decoration (Kidder, 1915, p. 427) I minimized the importance of the panel, stating that the decorations were based on pairs of opposed triangles. The paneling lines are, indeed, often omitted from the Pajaritan material which I was then studying and the points of the triangle do not reach the opposite banding line. But the Biscuit A and early Biscuit B specimens now available indicate beyond question that such triangular figures must be considered direct descendants of triangular fields cut from the corners of rectangular panels, rather than as independent triangles.

Panel layout. Because the Standard band of Biscuit B is less wide than the Standard band of Biscuit A, the panels are more nearly rectangular (fig. 58, *a*). They are subdivided, as in Biscuit A, by oblique lines which cut off diagonally opposite upper and lower corners of each panel (fig. 58, *b*). Of the total number of panels examined, 90% have the upper left and lower right corners cut off, only 10% the upper right and lower left[1].

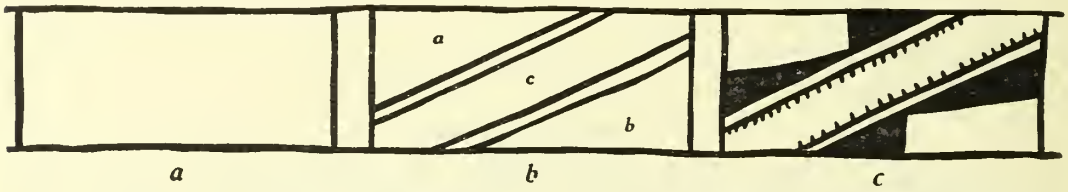


Fig. 58. Biscuit B. Analysis of the Standard panel. *a:* The panel produced by drawing paneling lines between the banding lines. *b:* The "a", "b" and "c" fields produced by the drawing of oblique lines. *c:* The "a" and "b" fields decorated. Diagram.

Panel design. The oblique lines just mentioned produce, as in Biscuit A Standard band panels, two right-triangular fields—"a", "b"—with an elongated oblique space—"c"—between their hypothenuses (fig. 58, *b*). The decoration of the "a" and "b" fields is extraordinarily conventional, the following treatments being used again and again:

Standard triangle
Bent line
Sitting key

The relative abundance of and the correlation between the treatments will be taken up after they have been described.

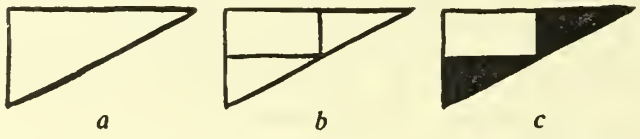


Fig. 59. Biscuit B. Analysis of the Standard triangle. *a:* The triangle outlined. *b:* Subdivision by cutting off the acute angles. *c:* Final form, the angles filled with black to reserve a small rectangular field. Diagram.

The *Standard triangle* is analogous to that of Biscuit A. Its acute angles are cut off (fig. 59, *b*) and filled in with black, leaving a rectangular open field in the right angle (fig. 59, *c*). The reserved rectangular field may contain a pair of opposed key figures, one of them set in the corner formed by the original right angle of the field, the other on a stalk or "floating" (see fig. 60, *a;* also fig. 64, *a-f*). This is without doubt an early method, as it is habitual in Biscuit A (no case of undecorated rectangle has been noted in that ware). Furthermore, the Biscuit B bowls and sherds which bear opposed keys in the rectangular field are almost all of the light gray type

[1]In Biscuit B from the Pajaritan sites Otowi and Tschirege there is less uniformity, Otowi shows 65% and 35%, Tschirege 40% and 60%, the first figure in each case representing upper left, lower right subdivision (data from the writer's notes on the Hewett collections at Santa Fe and the United States National Museum).

Fig. 57. Biscuit B. *a*, *b*, *c:* Bowls of unusual form. *d:* Olla. *e*, *f:* "Salt dish" bowls. Diameter of *d*, 14½ inches.

with low rim. In the great majority of cases the rectangular field is left undecorated (fig. 60, *b-e*). Often it is truly rectangular (fig. 60, *b*) and these examples again appear to be on the average early. Such severity was, however, apparently distasteful and many variants were produced (I believe in late times) by widening the angle between the lines which cut off the corners and so altering the field from the exactly rectangular to the various shapes seen in fig. 60, *c*, *d*, *e*. This process was not carried at Pecos to any such lengths as it was on the Pajarito Plateau, where the lines cutting off the corners often fail to meet.[1] Such cases are rare at Pecos (for examples see fig. 64, the "b" field of *k*).

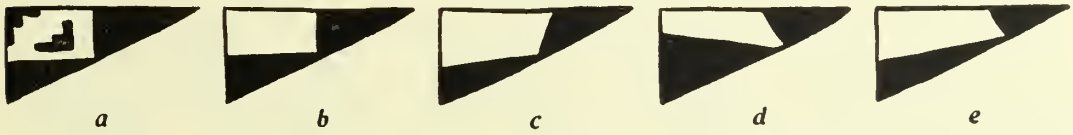


Fig. 60. Biscuit B. Variants of the Standard triangle. It is thought that *a* and *b* are early forms. Diagram.

Fig. 61. Biscuit B. *a, b:* Standard triangles in the "b" field with a single small key figure in the reserved rectangle. *c:* Apparently degenerate Standard triangle with Sitting key. *d:* Triangular field reduced in area by three small triangles pendent from its hypothenuse, Sitting key in right angle. *e:* The normal Sitting key arrangement. Diagram.

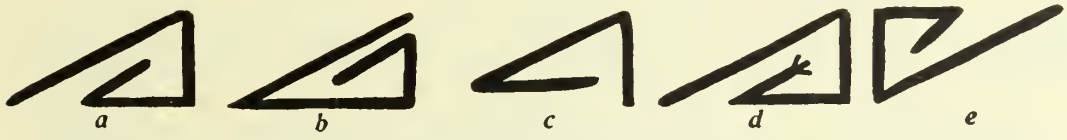


Fig. 62. Biscuit B. The Bent line. *a:* Normal form when used in the lower right hand or "b" field of a Standard panel. *b, c, d:* Unusual variants. *e:* Normal form when used in the upper left or "a" field of a Standard panel. Diagram.

A rare variant of the Standard triangle has a single small key in its right angle (fig. 61, *a, b*). Four of the five Pecos examples are found in the "b" field, in three of them the key is only two-stepped. This treatment is allied to that in which the larger "Sitting" key (see fig. 61, *c-e*) is used. I think it must be a late development because of the oblique cutting off of the corners of the triangle (see fig.61, *a, b*).

The *Bent line*, the second of the three common methods of filling "a" and "b" fields, is a very simple arrangement (figs. 62; 65, *h-u*). A heavy line, produced by a succession of single strokes of a broad brush, sweeps obliquely up from the lower banding line (if in a "b" field), or down from the upper banding line (if in an "a"

[1]Kidder, 1915, p. 428 and pl. XVIII, 6-11.

field), reaches the diagonally opposite corner of the panel, crosses back vertically along the paneling line, passes along the banding line from which it arose and ends in a short projection parallel to and within its first movement. Study of the brush strokes proves that the drawing actually took place as described. This is the normal appearance of the Bent line; variants such as appear in fig. 62, *b*, *c* are evidently errors. Embellishment of the line is, at Pecos, extremely rare. We have one sherd which shows a tripartite end (fig. 62, *d*); this is not unusual on the Pajarito[1]. The use of two or three bent lighter lines with interior dotting, which is also common on Pajaritan Biscuit B[2], has not come to light at Pecos.

The *Sitting key* is a single large key (figs. 61, *e;* 66, *a-n*) backed into the right angle of the "b" field, less commonly in the "a" field. The key is almost always three-stepped and has the short central step characteristic of Biscuit keys. The line which delimits the field whose corner is occupied by the key is normally dotted, but it may be double with interior dots (fig. 66, *f*, *g*). The interior of the line may also be set with three triangles (fig. 61, *d*). There seems, as has already been pointed out, to be some relation between the Sitting key and the single small key in certain Standard triangles (see fig. 61, *a*, *b*).

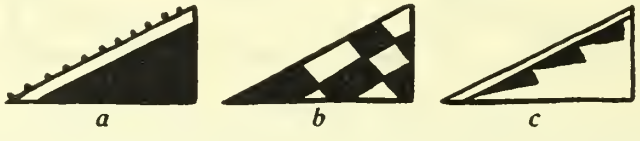


Fig. 63. Biscuit B. Uncommon treatments of "b" fields in Standard band panels. Diagram.

The three arrangements just described were used habitually. There are, however, a few aberrants. The "b" field may be checkerboarded (fig. 63, *b*); the triangle (either "a" or "b") may be painted solid (fig. 63, *a*), or the inner side of its hypothenuse may be occupied by three small triangles which produce a serrate appearance (fig. 63, *c*). Still another aberrant is what I have called in a former publication the "drawn curtain"[3]. The single example from Pecos is shown in fig. 66, *s*, a different handling of the same figures from the same bowl in fig. 66, *r*. Finally, one of the fields may be left blank (fig. 66, *p*, *q*), but this is very rare.

The Standard triangle is indeed standard in the Pecos Biscuit B decorative system. Panels from sixty-three band or *awanyu* patterns could be copied or restored with certainty (figs. 64, 65, 66). Of these, forty-seven or nearly 80% have the Standard triangle in either the "a" or the "b" field, twenty-four or about 40% have it in both fields of the same panel. As to its relation to the other two common arrangements: it occurs with the Bent line in ten of that figures fourteen manifestations; it occurs with the Sitting key in ten of its seventeen appearances.

[1] Kidder, 1915, pl. XVIII, 14.
[2] Kidder, 1915, pl. XVIII, 13.
[3] Kidder, 1915, p. 429, fig. XVIII, 16.

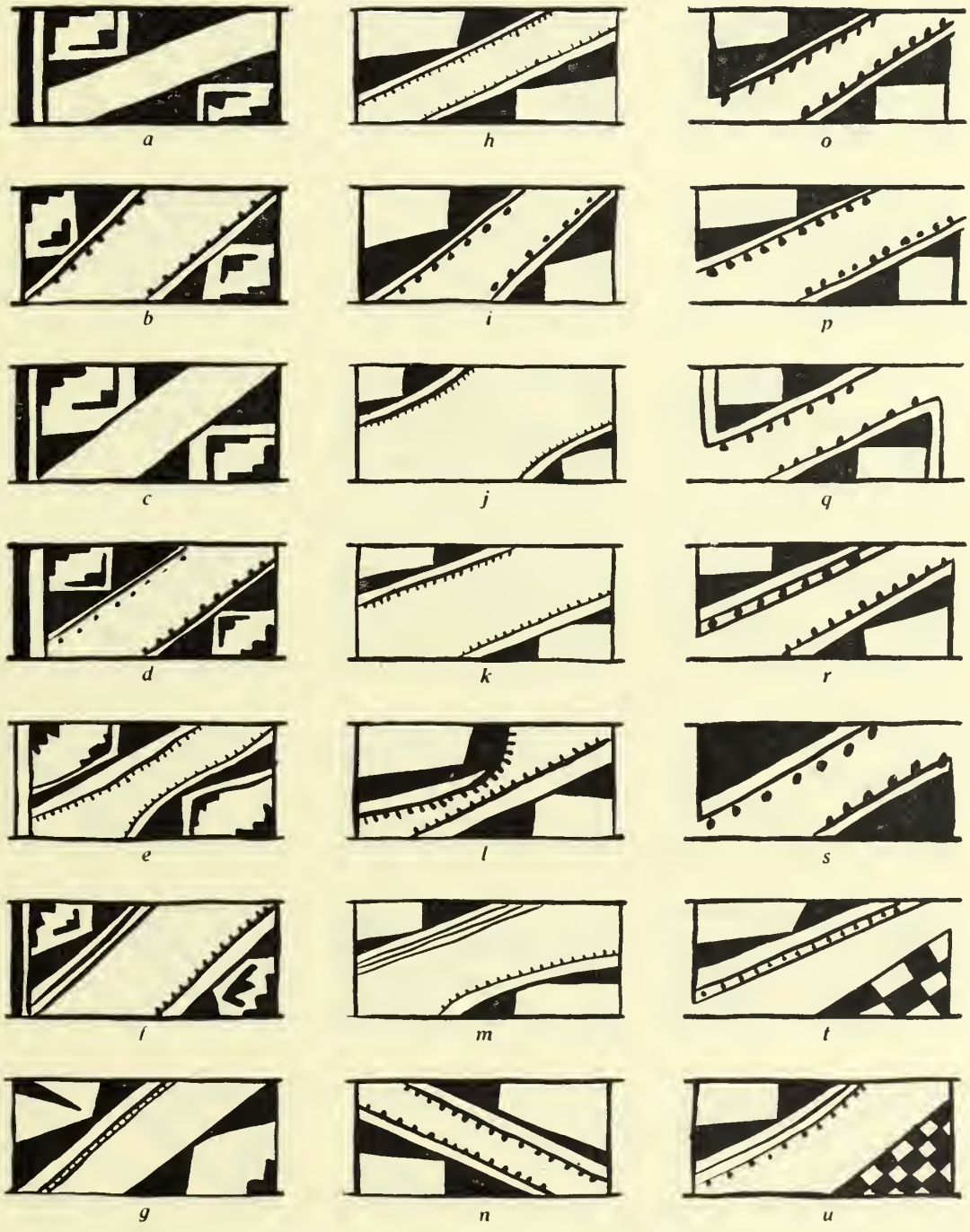


Fig. 64. Biscuit B. Panels from Standard bands containing various forms of the Standard triangle. The examples *a* to *f* are thought to be early. Slightly formalized copies.

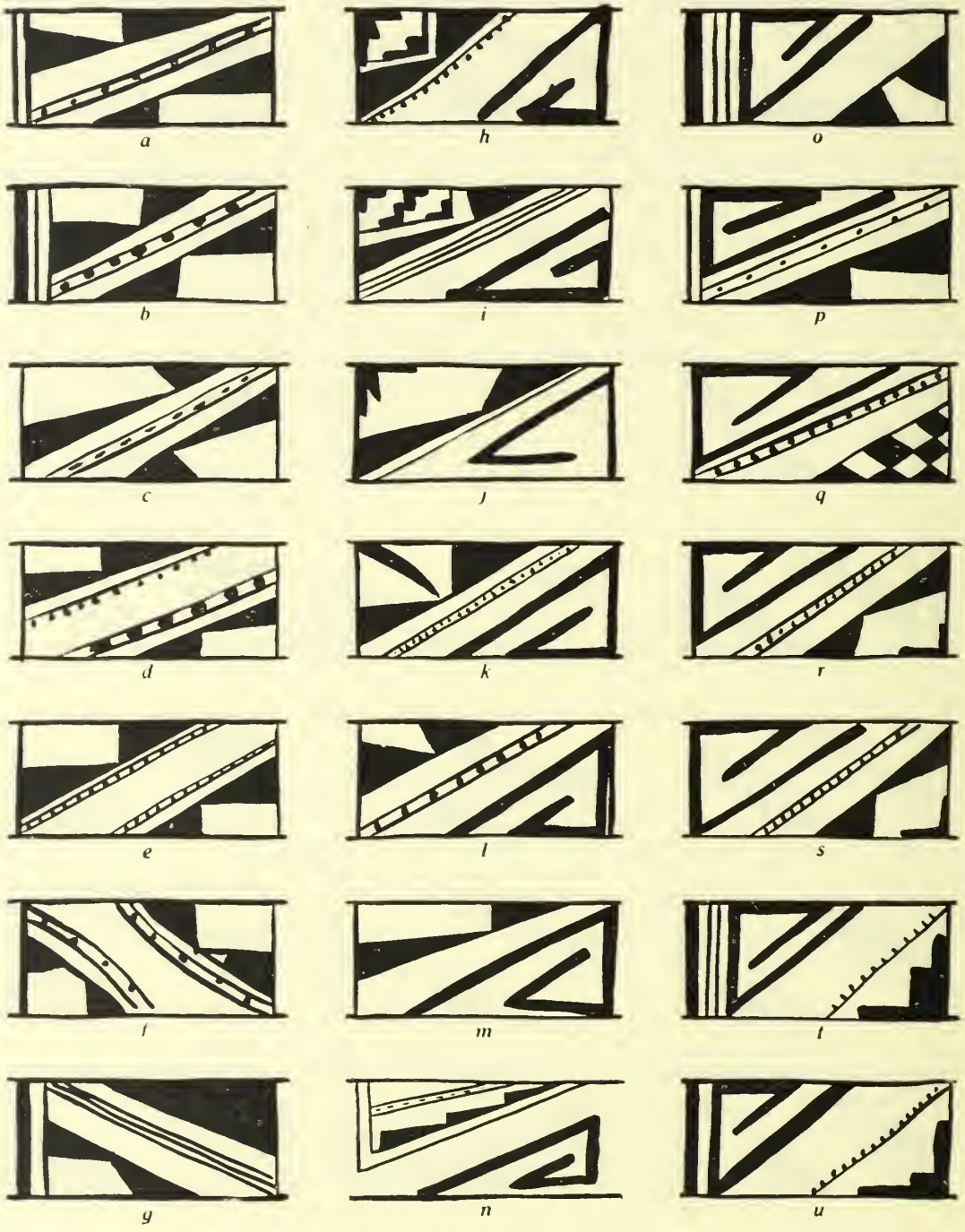


Fig. 65. Biscuit B. Panels from Standard bands. *a-g:* The Standard triangle. *h-u:* The Bent line in various associations. Slightly formalized copies.

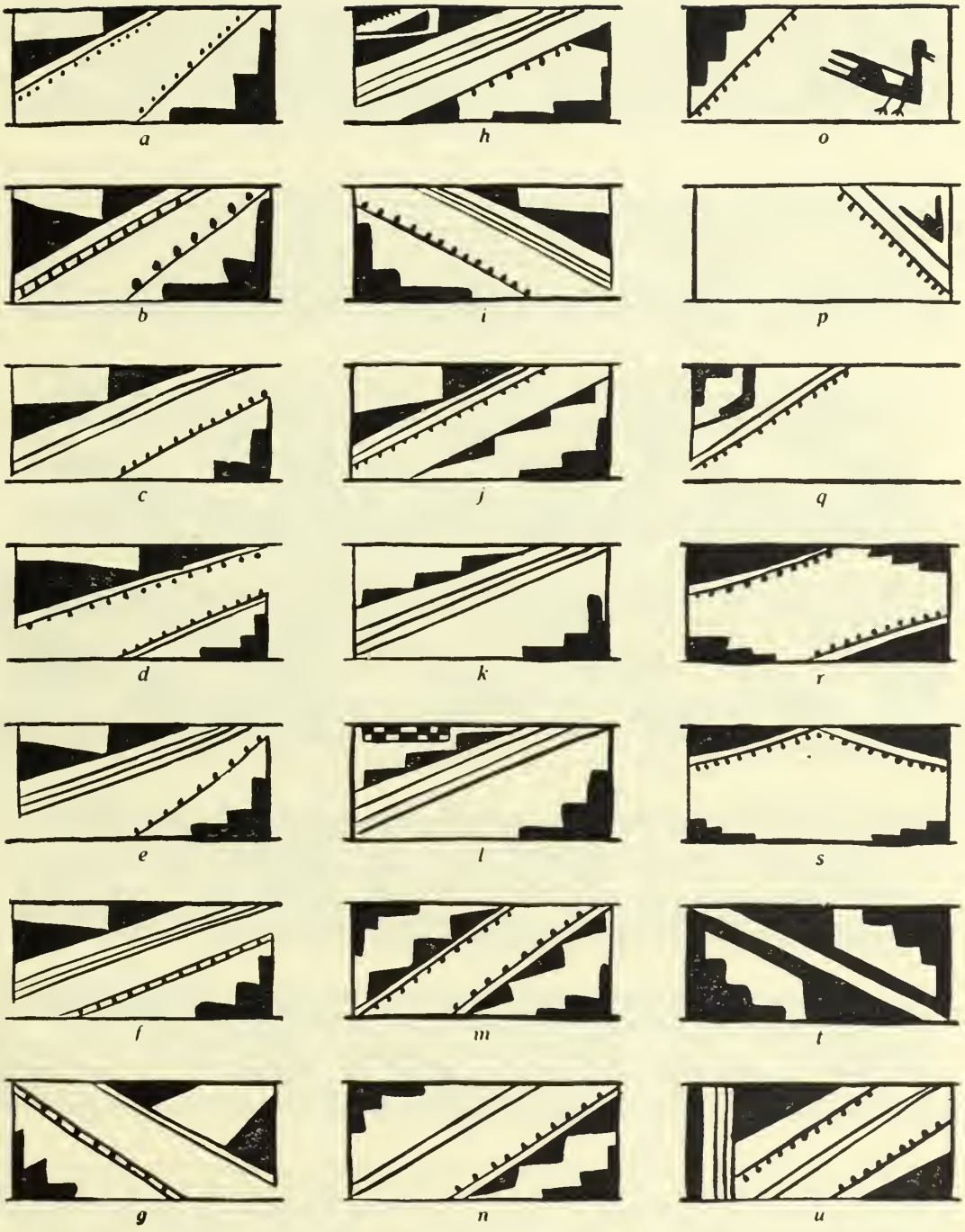


Fig. 66. Biscuit B. Panels from Standard bands. *a-n:* The Sitting key in various associations. *o-u:* Aberrant panels. Slightly formalized copies.

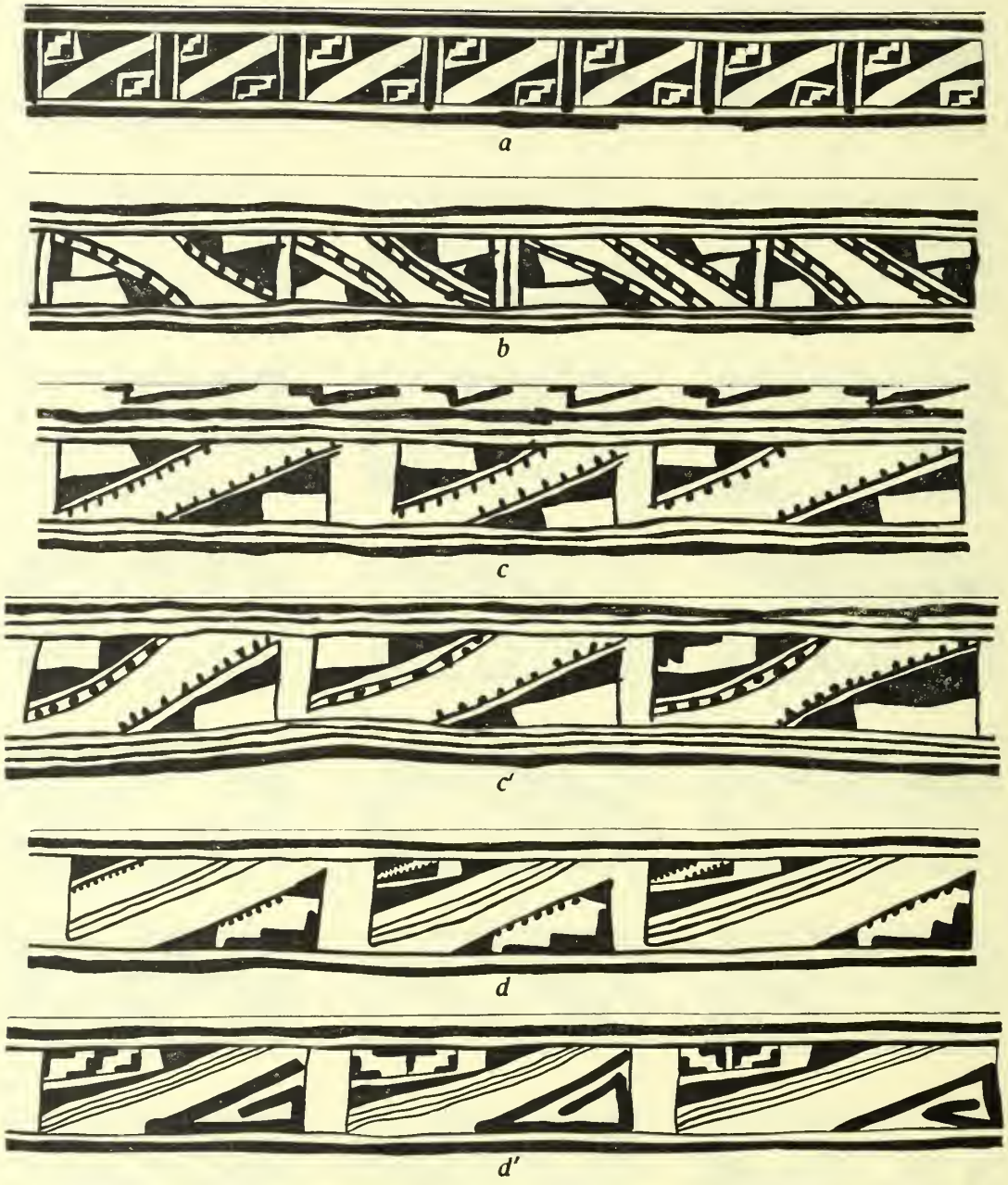


Fig. 67. Biscuit B. Standard bands with standard triangle. *a:* Early form, note single framing line, heavy paneling bars and small key figures; from a bowl exterior, the interior bears an *awanyu* (see fig. 73, *d*). *b:* Interior, exterior zigzag (see fig. 71, *c*). *c*, *c'*: Interior and exterior of same bowl. *d*, *d'*: Interior and exterior of same bowl; *d*, Standard triangle combined with Sitting key; *d'*, Standard triangle combined with Bent line. From bowls 10 to 11 inches in diameter.

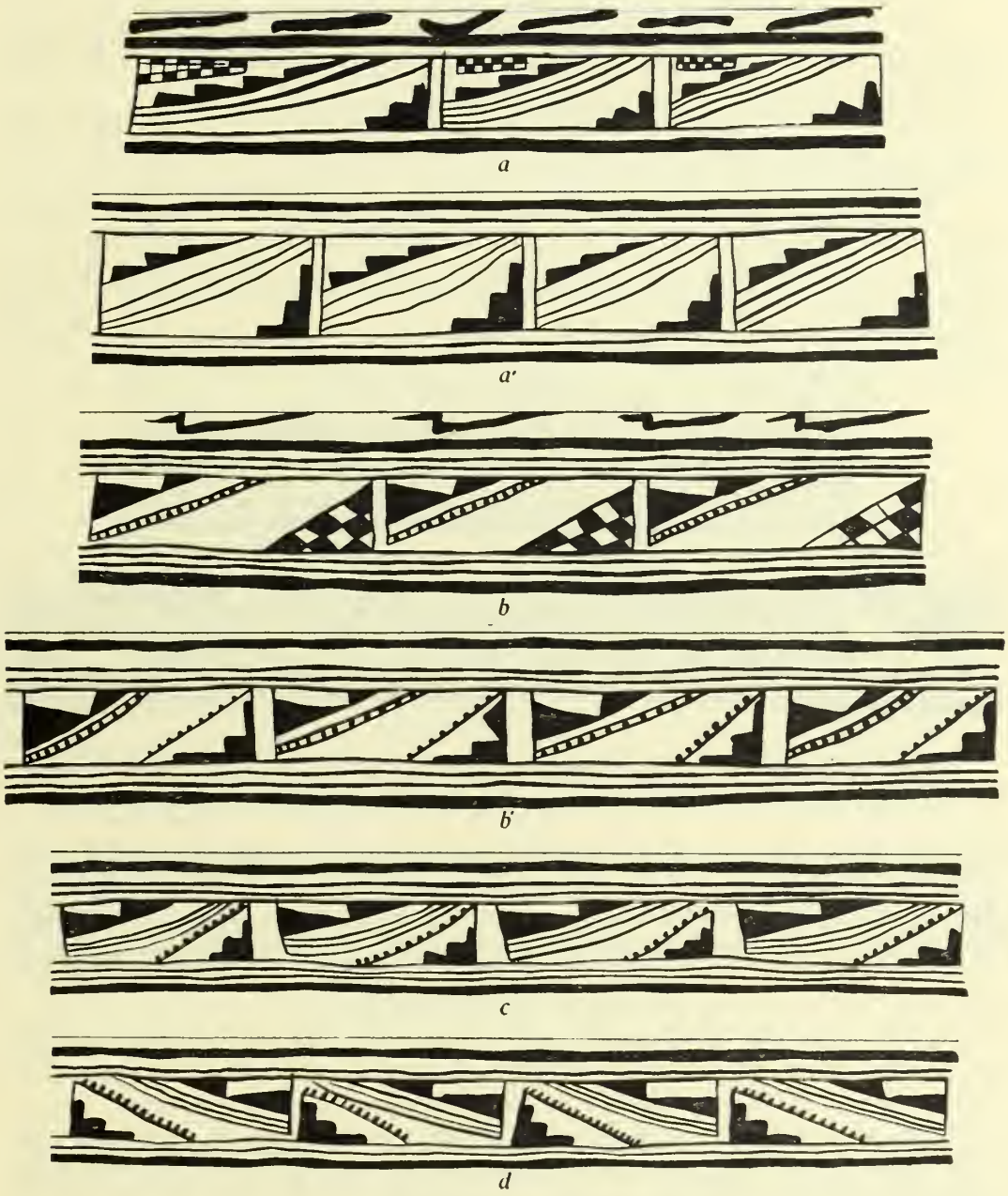


Fig. 68. Biscuit B. Standard bands with Sitting key. *a*, *a'*: Interior and exterior. *b*, *b'*: Interior and exterior. *c*: Exterior; the interior carries a band *awanyu* (fig. 75). *d*: Exterior; the interior decoration is a zigzag (see fig. 71, *b*). From bowls 9 to 12 inches in diameter.

The Bent line is used fourteen times, ten times with the Standard triangle, twice with the Sitting key, once with a checkerboarded triangle, and once with the triangle with interiorly serrated hypothenuse (fig. 65, *n*).

The Sitting key occurs seventeen times, ten with the Standard triangle, four with the serrated hypothenuse triangle, twice with the Bent line, and once with a naturalistic bird (fig. 66, *o*).

ZIGZAG bands occur on but eight of the Pecos bowls (fig. 71). The pattern, however, with its oblique layout and its abundant use of dots follows sound Biscuit B traditions, and its place on the vessel and its framing correspond with those of Standard bands. Save for one plain three-line (fig. 78, c′) and one dotted four-line example (fig. 71, *c*) the device is always composed of two lines with dots between them.[1]

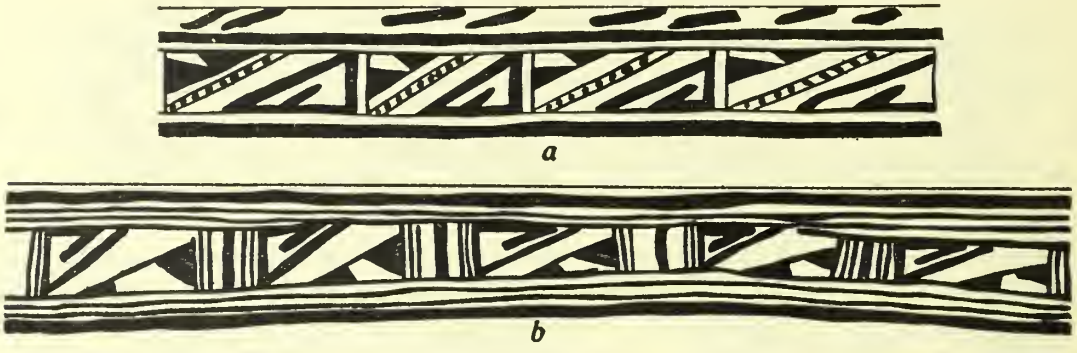


Fig. 69. Biscuit B. Standard bands. Standard triangle with Bent line. *a:* Interior; exterior identical. *b:* Exterior; interior zigzag (see fig. 71, *a*). Bowl *b* is 9½ inches in diameter.

The zigzag appears on bowl exteriors in six cases, the interior decoration being twice the *awanyu*, once pendent triangles, once Standard band, once double flag, once queer (bird?) figures. In both its interior uses the exterior pattern is the Standard band. It seems to have run through the entire life of Biscuit B.

PENDENT TRIANGLE PATTERNS

Pendent patterns of hatched triangles are, as in Biscuit A, confined to small bowls (fig. 56, *a*, *b*). We have six complete specimens and some forty sherds; thirty-four are bowls or sherds with plain rim, twelve with low semi-standing rim.

The pendent hatched triangle occurs most commonly on the interiors of the bowls, where three (fig. 72, *b*, *e*) or four (fig. 72, *a*, *c*) of the figures are used. In all cases they hang from the rim without a framing line. The short side of the triangle is approximately perpendicular to the rim, the hatching runs at right angles to the short side, and the body of the figure sweeps off to the right. The remaining (reserved) space may be undecorated (fig. 72, *d*, *e*), or may contain a life figure (fig. 72, *a*, *b*, *c*).

[1]Pajaritan zigzags are somewhat more elaborate, see Kidder, 1915, pl. XIX.

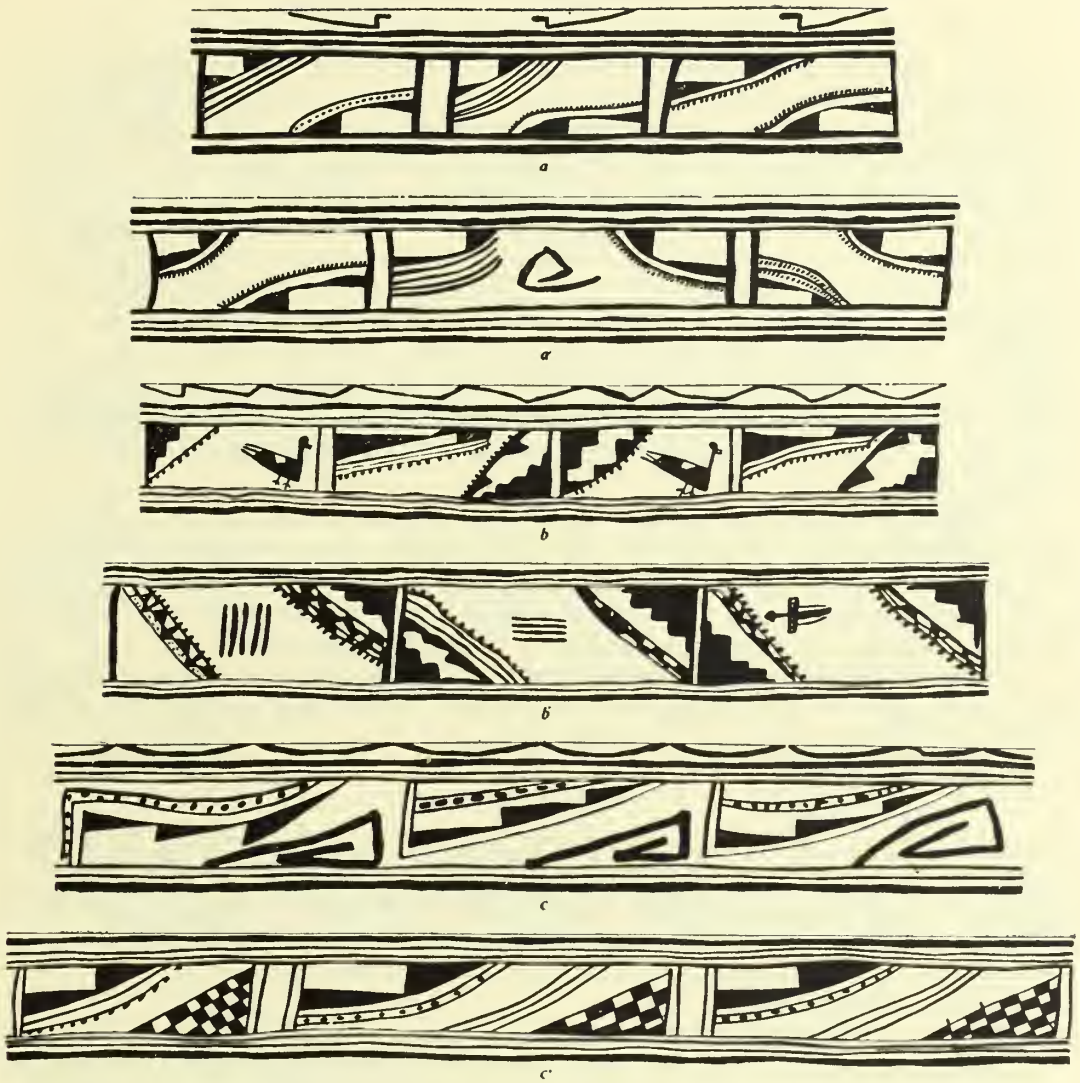


Fig. 70. Biscuit B. Standard band. Interior and exterior designs of three bowls thought to be of late period. Diameter of bowl *c*, 15 inches.

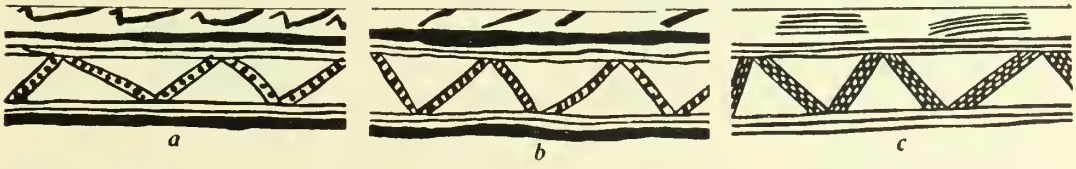


Fig. 71. Biscuit B. Zigzag band decorations. Each drawing represents about one-third of the circumference of a bowl. *a:* Interior; for exterior see fig. 69, *b*. *b:* Interior; for exterior see fig. 68, *d*. *c:* Exterior; for interior see fig. 80, *a*. Widths of bands (exclusive of framing) about 2 inches.

The exteriors of plain rimmed bowls, whose interiors bear hatched triangles, are also decorated in about half of all cases (data from complete pieces and sherds) with pendent hatched triangles, four or five in number (fig. 72, *c'*, *d'*). The exterior triangles depend from the rim without a framer. The sherds show that, unlike the interior triangles, they habitually run upward to the left (figs. 72, *d'*; 74, *a*), the dextral example illustrated in fig. 72, *c'*, being unusual. Other exterior patterns used on plain rimmed bowls with pendent triangle decoration appear in fig. 72, *a'*, *e'*; the Standard band is also common (fig. 72, *b'*). We have no standing rimmed bowls or sherds with interior pendent triangle whose exteriors are also decorated with triangles, such specimens generally seeming to bear, according to the sherds, one form or another of the Standard band. The pendent hatched triangle occurs in one case as the exterior decoration of an *awanyu* bowl (fig. 74, *a*); and the framework of one of the *awanyu* patterns is in the pendent triangle manner (fig. 73, *d*; compare with fig. 72, *b*).

In general the pendent hatched triangle bowls appear to be early in the Biscuit B series because they have plain or low standing rims, never high standing rims; they are also preponderatingly light gray in color. Some, indeed, would even seem to belong in the category of Biscuit A bowls with exterior decoration (for example, fig. 72, *b*, *b'*; note the heavy paneling bars of the exterior pattern).

The pendent hatched triangle is common in the decoration of Biscuit B on the Pajarito Plateau[1]. It is perhaps less abundant in the Chama drainage, only one piece being figured by Jeancon from Poshuouinge[2].

AWANYU PATTERNS[3]

Area covered. Bowl interior in all-over (fig. 73, *b*, *c*, *e*, *f*), band (fig. 73, *g*, *h*)[4], or pendent triangle arrangement (fig. 73, *d*). In one case (fig. 78, *a'*) as a band on the exterior of a bowl. The exterior decoration of bowls having the *awanyu* on the inside is usually the Standard band (see fig. 74, *b-f*); but the pendent triangle appears in one instance (fig. 74, *a*); and in another case (the bowl illustrated in fig. 73, *c*) there is a two-line dotted zigzag.

Framing. Where present is the same as in Standard bands.

Band presentation—four examples. The framing is conventional, heavy upper and lower framing lines with two or three narrower inner framers. The *awanyus* lie between the framing lines, but do not touch them. On one of our bowls a single long figure with two heads makes up the pattern (fig. 73, *g*); two of the bowls have two single-headed *awanyus* (figs. 73, *h*; 75); one bowl has two two-headed *awanyus* (fig. 78, *a'*). The head is usually attached to the elongated body by a short stalk. The body is treated as a paneled band, pairs of Standard panels filling the field in fig. 75; Standard panels alternating with panels containing cribbing in fig. 73, *g*, *h*. In two cases the body ends in a bifurcation composed of two triangular projections

[1] See Kidder, 1915, p. 430.

[2] Jeancon, 1923, pl. 41, *a*.

[3] In the classification on p. 107 the *awanyus* were divided into band and non-band types. Here all are considered together.

[4] The *awanyu*, in band form, was also used in the decoration of ollas (see fig. 57, *d*).

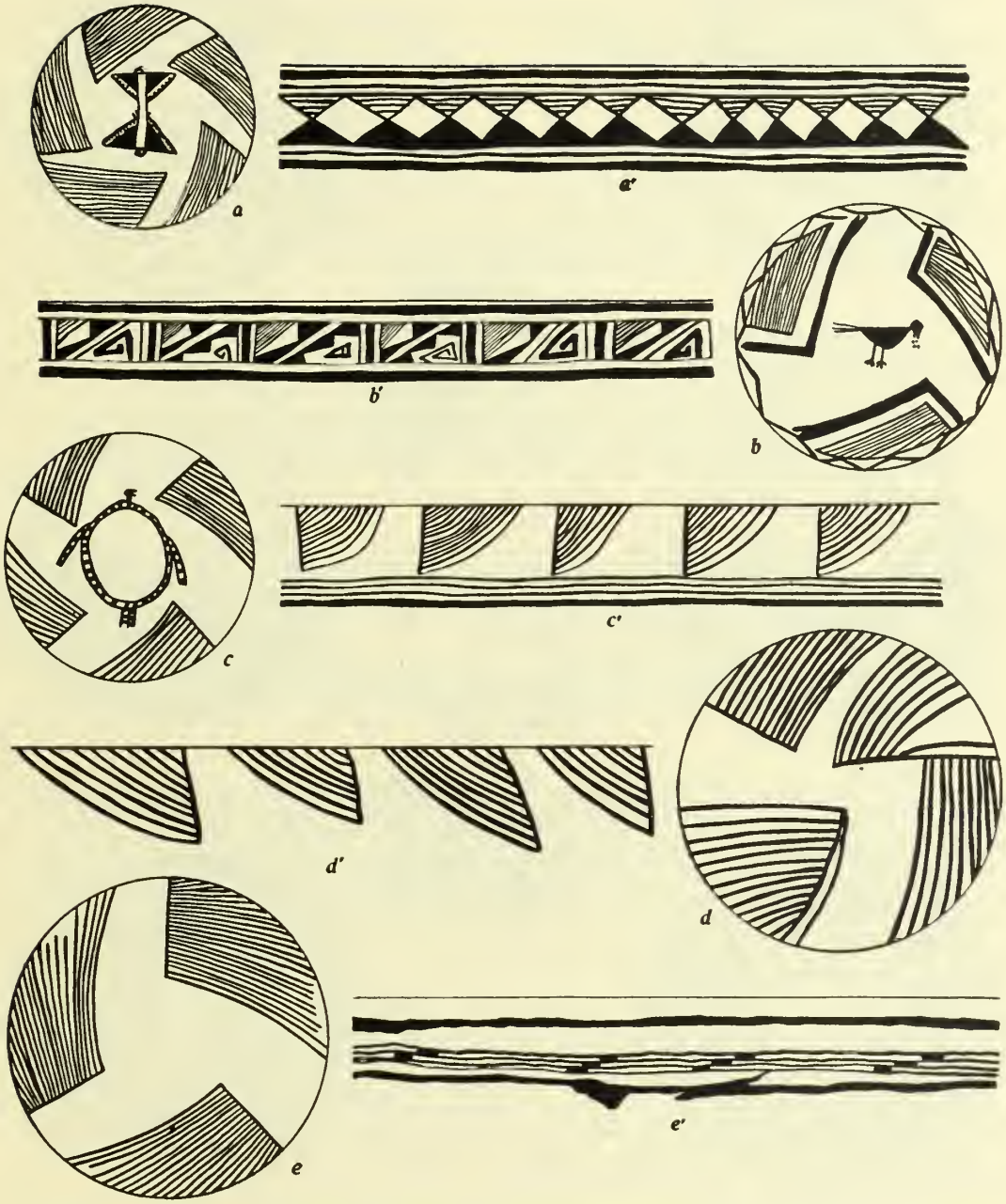


Fig. 72. Biscuit B. Bowls with pendent triangle decoration, interiors and exteriors. From *d'* and *e'* there has been omitted about one-fifth of the design. Diameter of bowl *e*, 9 inches.

Fig. 73. Biscuit B. *Awanyu* bowls. The exterior decorations of six of these specimens are illustrated in fig. 74 where *a* of this figure appears at *c*; *b* at *b*; *e* at *d*; *f* at *a*; *g* at *e*; *h* at *f*. The exterior decoration of *c* is a two-line dotted zigzag (not figured); for that of *d*, see fig. 67, *a*. Diameters of bowls from 9 to 13 inches, except *g* which is 17 inches.

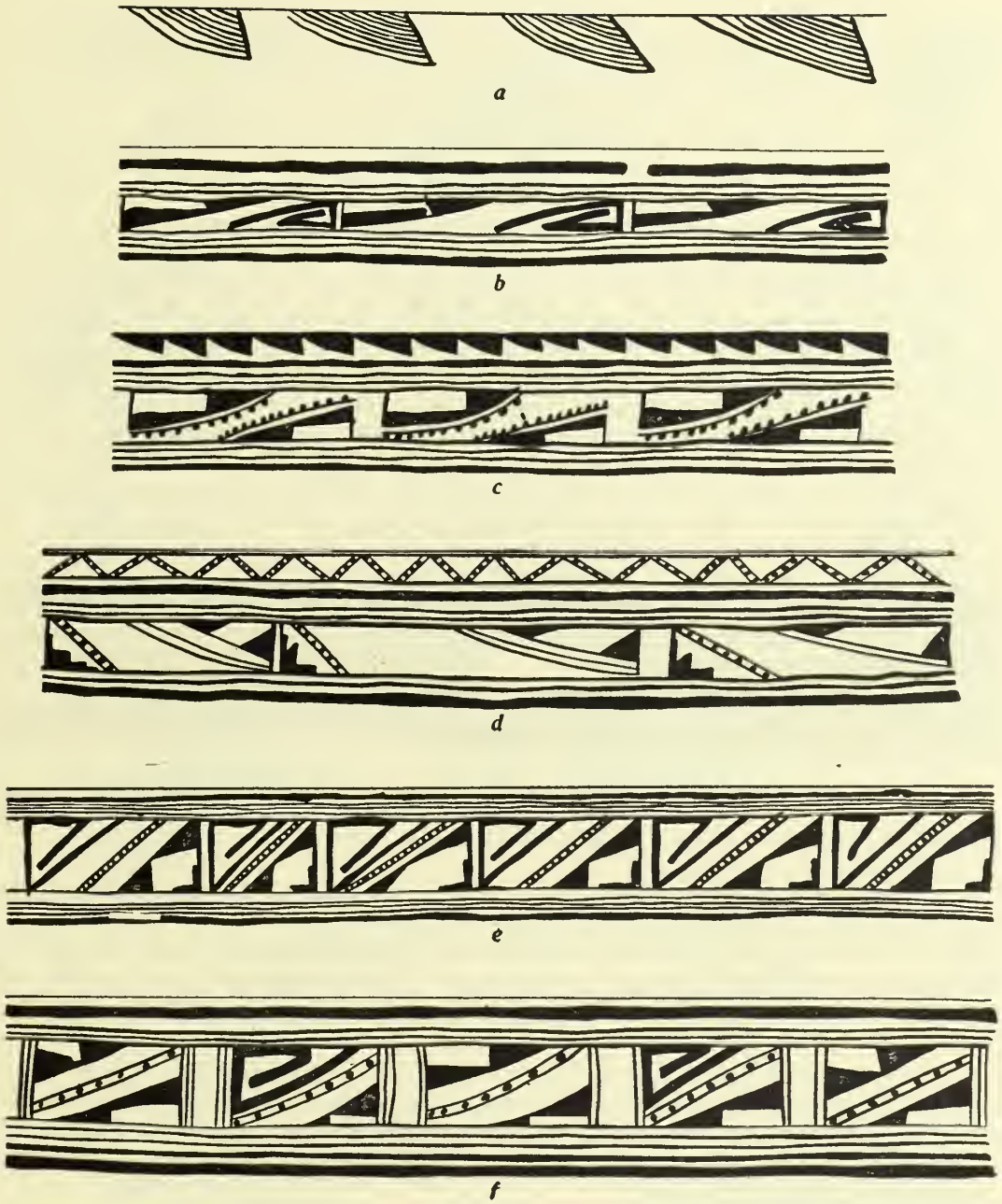


Fig. 74. Biscuit B. Exterior decorations of *awanyu* bowls. The interiors are illustrated in fig. 73, where *f* corresponds to *a* of this figure; *b* to *b*; *a* to *c*; *e* to *d*; *g* to *e*; *h* to *f*.

(figs. 73, *h;* 75). The very crude *awanyus* on the exterior of the small bowl illustrated in fig. 78, *a'*, have checkerboarded bodies; the heads, only one of which has the conventional five points, are attached directly to the body.

All-over presentation—four examples (fig. 73, *b, c, e, f*). Under the rim is a conventional set of framing lines (it should be noted, however, that in fig. 73, *b* the heavy outer framer has the line-break. The outer framer of the upper framing set of the exterior of the same bowl is also broken (fig. 74, *b*). This is one of the two occurrences of this phenomenon in Biscuit decoration which have come to my attention; for the other see fig. 78, *b*). The pattern in three cases (fig. 73, *b, c, e*) consists of an elongated body drawn across the centre of the bowl. To opposite sides of the two ends of this are attached projections which fill the remaining open space and terminate in five-pointed heads. Bodies and projections therefrom are treated as bands, with a zigzag (fig. 73, *c*); or panels with Standard band devices and cribbing (fig. 73, *b, e*). The swing of the projections is twice counter clockwise (fig. 73, *b, e*), once clockwise (*c*). Another type of all-over presentation occurs but once (fig. 73, *f*). Three stalks, each consisting of a single heavy line and a set of lighter lines (thus suggesting a set of framers), run outward from near the centre, bend counterclockwise near the rim to end in five-pointed heads. This pattern has no framing lines.

Fig. 75. Biscuit B. Band *awanyus* on bowl interior. For exterior see fig. 68, *c*. The color and rim-form of this vessel, together with the paneling bars in the *awanyus* and the rectangular reserved spaces in the Standard triangles make it seem probable that it is an early specimen. Diameter of bowl, 10 inches.

Pendent triangle presentation—one example (fig. 73, *d*). The slender, hatched, stalks are placed in large triangular fields pendent from close under the rim. The five-pointed heads are oriented counter-clockwise. The bowl bearing this pattern is obviously a very early specimen, possibly even made in Biscuit A times (see its exterior decoration, fig. 67, *a*). It closely resembles the pendent triangle bowl illustrated in fig. 72, *b*, which is evidently also an early piece.

The pattern shown in fig. 73, *a* does not fall into any of the above classes. It is not strictly speaking a band, because it has no upper framers; nor can it be termed all-over since there is a set of lower framers which produces an open circle in the bowl bottom. The two checkerboarded stalks run toward the rim; are bent clockwise and end in dotted heads.

There is presented a group (fig. 76) of *awanyu* heads from sherds in order to place on record as much material as possible regarding this interesting figure.[1] A

[1] Illustrations of *awanyu* patterns from the Pajarito are to be found in Hewett, 1908, pl. XV; Kidder, 1915, pls. XX, XXI, fig. 13; Wilson, 1918, figs. 31, 32. Patterns from Poshuouinge on the Chama are reproduced in Jeancon, 1923, figs. 15, 17, 22, 32, 38.

Fig. 76. Biscuit B. *Awanyu* heads from sherds. *h, l:* Olla body patterns; the rest are from bowls. Length of *h*, 7½ inches.

very aberrant *awanyu*-like figure from the interior of the small, square bowl mentioned in discussion of vessel-shapes (p. 106, fig. 53, c) is reproduced as fig. 77, *a;* and a fragmentary bowl, apparently with two *awanyus* crudely painted in band arrangement as fig. 77, *b*.

Awanyu is the Tewa name for plumed serpent, and the present figure has been identified by Hewett, on native information, as the symbol of this mythical monster[1]. Mrs. Wilson disagrees, suggests that it may represent the human hand, but concludes that its true nature will probably never be known[2].

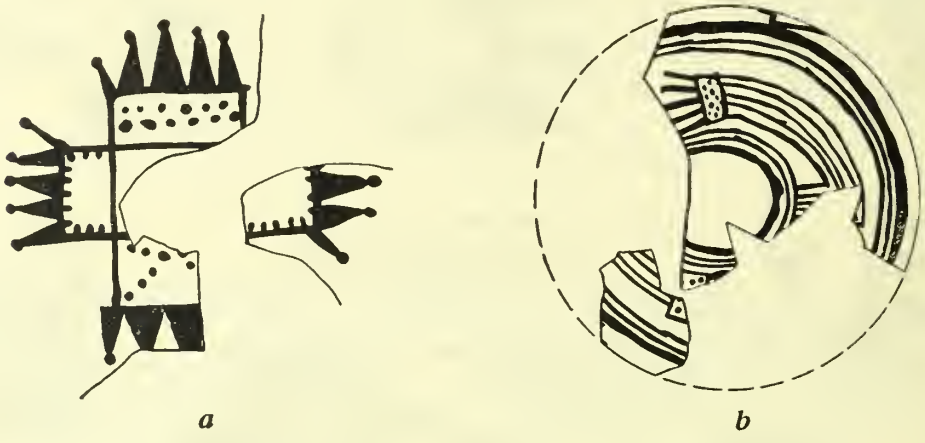


Fig. 77. Biscuit B. Aberrant *awanyu* patterns. *a:* Figure from ceremonial (?) bowl. *b:* Fragmentary bowl with very crude *awanyus*. *a*, about one-third; *b*, about one-sixth natural size.

Jeancon is also skeptical as to Hewett's identification. Tewa informants from San Juan, Santa Clara and San Ildefonso stated to him that although it might be the plumed serpent, they did not think so. They were positive it was not a hand sign. Some were doubtful as to its meaning; others held that it symbolizes growing corn. This, they explained, was borne out by the dots which represent the kernels, and the points on the tops (the five projections) which represent the tassels on the top of the green ear. A similar opinion was expressed by Indians from Taos[3].

I can add nothing to this discussion, except to say that I feel sure the figures must have been symbols or conventional representations which carried a definite meaning. They seem to me to lie about midway between such realistic depictions as the birds and turtles, and the apparently purely decorative devices of Standard band, pendent hatched triangles, etc.

[1] 1908, p. 91.
[2] 1918, p. 312.
[3] Jeancon, 1923, pp. 60, 61.

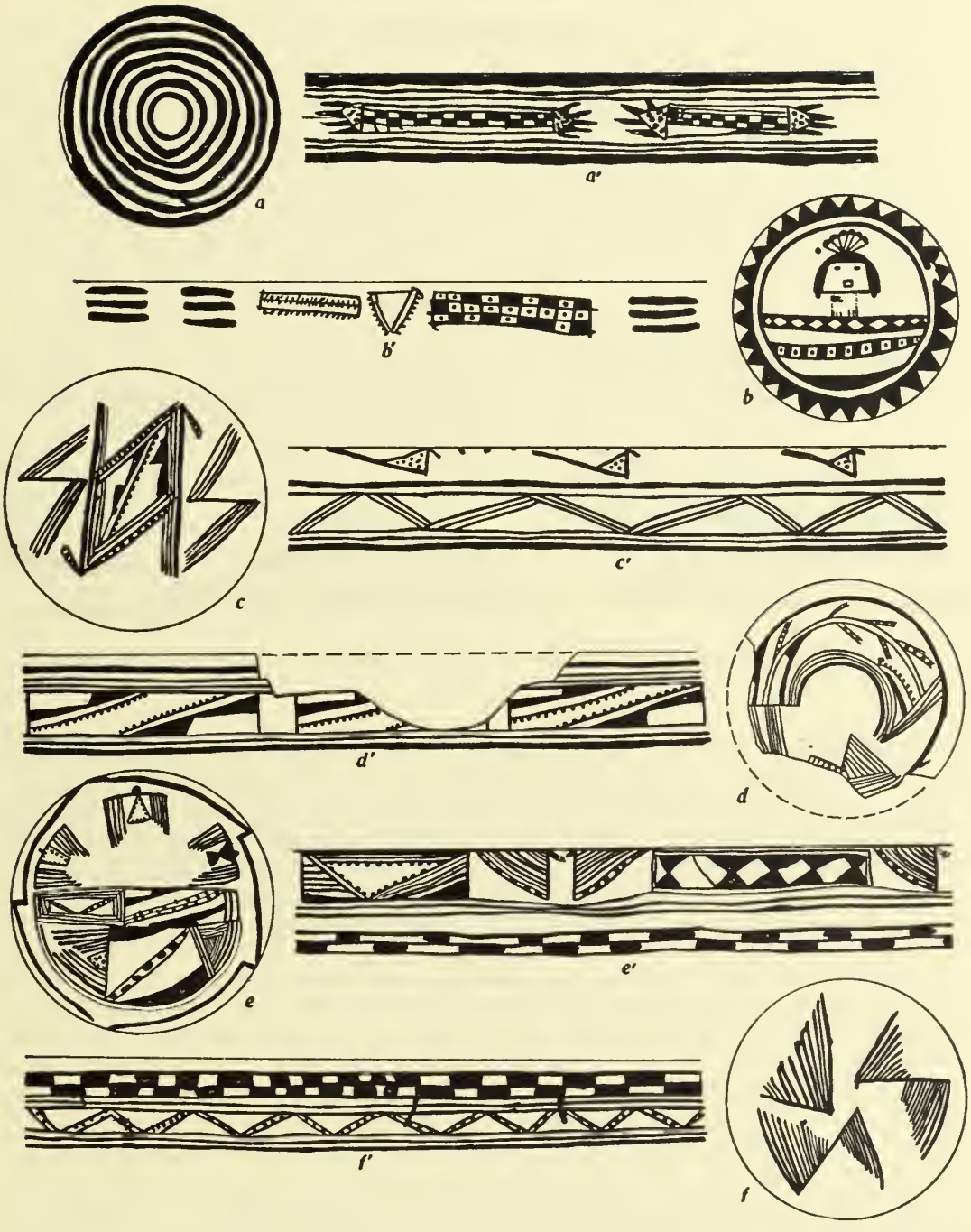


Fig. 78. Biscuit B. Bowls with unusual decorations; interiors and exteriors. Diameter of bowl *e*, 9½ inches.

ABERRANT PATTERNS

Although Biscuit B decoration is in general remarkably uniform, there are in the collection several pieces which, in one way or another, differ widely from the normal. Some of these are shown in fig. 78; the others in figs. 79 and 80. It is impossible to say whether such atypical pieces are the result of mere flights of uncontrolled fancy, or whether they were painted for some special, perhaps ceremonial, reason. It seems desirable to illustrate them all, for they may eventually be linked up with specimens from other areas, or may serve to throw light on local cult-practises.

The bowl appearing in fig. 78, *a*, *a'*, is presumably no more than an example of bungling workmanship; the *awanyus* are badly drawn and three of the four "heads" have four instead of the conventional five points. The concentric circles of the interior are not duplicated in sherd or vessel of the Biscuit B collection from Pecos.

Fig. 79. Biscuit B. Pattern from fragmentary bowl; two elongated figures ending in human (?) heads with eagle feathers. Diameter of bowl, 11½ inches.

Better painted, at least on the inside, is fig. 78, *b*, *b'*. The general layout is foreign to Biscuit B traditions, as is the naturalistic human head with its clearly represented hair-dressing and crest of black-tipped feathers. There is obvious effort to emphasize a line break in the upper framer. A fragment of another human head with black-tipped feathers comes from the interior of a sherd of a small bowl (fig. 81, *b*). What is also presumably a pair of human heads appears in the pattern reproduced as fig. 79. Only the eyes are indicated; the three plumes with offset black tips are without doubt eagle feathers[1].

Little need be said of the four remaining aberrants shown in fig. 78 as the illustrations make clear their peculiarities. That at *c* may possibly have *awanyu* affinities in the small dotted appendages at opposite corners of the central diamond-shaped figure (cf. fig. 73, *b*)[2]. Possibly allied are the dotted streamers in *d*. Asymmetrical patterns, almost never seen in Pecos pottery design, appear in *d* and *e;* the latter presents bird motifs both within and without. Two of the three figures in bowl *f* are similar to a motif which occurs fairly commonly on Biscuit B of the

[1]In this identification I follow Chapman, who has published a study of eagle-feather symbolism (1927) Other examples in Pecos art are seen in Modern painted ware (cf. fig. 96) and in the incised decoration of certain pipes (to be illustrated in the forthcoming volume on the artifacts other than pottery).

[2]See also Wilson, 1916, fig. 32. The same dotted appendages appear on the "cross-figure" of Pajaritan Biscuit B (Kidder, 1915, pl. XX, 5, 6). As is there pointed out (p. 434) some connection between the "cross figure" and the *awanyu* is to be suspected. The "cross-figure" is not represented in the Pecos collection.

Pajarito[1]. There is only one other example from Pecos (fig. 78, *c*). Another peculiar design is that of fig. 80, *b*. It is from a sherd, and is therefore incomplete, but it seems probable that the pattern was a band consisting of a series of diamonds, their interiors reduced in area by cribbing and completed by a pair of large keys comparable to the "Sitting keys" of the Standard band. It is perhaps akin to, but more elaborate than, a design figured by Jeancon from Poshuouinge[2]. The elaborate and tasteful figures which connect the diamonds are not duplicated in any other Biscuit B decoration which I have seen. Another odd pattern is shown in fig. 80, *a;* speculation as to its significance is profitless, but the dotted appendages should be compared with those of fig. 78, *c* and *d*.

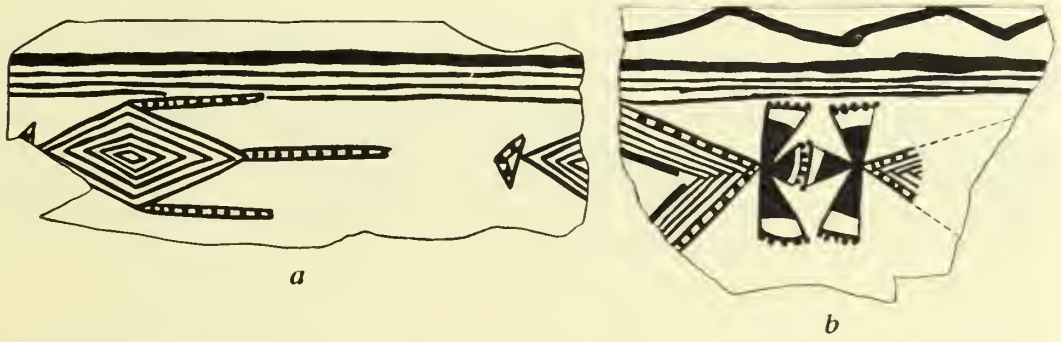


Fig. 80. Biscuit B. Unusual decorations from bowl interiors. The fragment *a* is from a 10 inch bowl; *b* is from a somewhat larger specimen.

THE ELEMENTS OF BISCUIT B DECORATION

Almost everything said of the general characteristics of Biscuit A design applies to Biscuit B. There is the same free use of lines, dots and black-filled angles. The brushwork is equally or even more slap-dash. In Biscuit B, however, the patterns cover less surface. The bands are not only narrower, but the whole design is so to speak loosened up, the lines stand farther apart and there being much less employment of small figures in such reserved spaces as the "a" fields of Standard triangles.

LINES, as in Biscuit A, are of much importance, but as a rule they are narrower, the only heavy lines being the relatively broad upper and lower framers of bands. The very thick single framer and stout paneling bar of Biscuit A are not seen, save in obviously early pieces (as fig. 64, *a*, *c*, *d* and 67, *a*). Hatching, the filling lines being, again as in Biscuit A, of the same width as the enclosing lines, is practically restricted to pendent triangles. Cross-hatching is apparently absent. Cribbing (see fig. 42) is practically confined to rectangular areas in *awanyus* (see fig. 73, *e*, *g*, *h*).

DOTS are abundant, sloppily and unevenly ticked along the marginal lines paralleling the hypothenuses of Standard triangles (fig. 64); or set between pairs of

[1] Kidder, 1915, p. 431 and fig. 12, there called the "double flag". See also Jeancon, 1923, fig. 4.
[2] 1923, fig. 9, left.

such lines (fig. 65). Checkerboarding has disappeared, except in a few "b" fields (fig. 64, *t*, *u*; fig. 65, *q*).

KEY FIGURES diminish in importance, the Filling key of Biscuit A occurring only in early pieces (fig. 64, *a-f*). The Thoroughbred key is no longer seen. Characteristic is the large, single unstalked Sitting key, normally three-stepped with two long elements and a short central one (fig. 66, *a-n*).

VEGETAL REPRESENTATIONS. These are apparently even rarer in Biscuit B than in Biscuit A, for but one sherd (fig. 81, *d*) turned up as against three of the latter ware. The depiction is apparently the same (cf. fig. 46), perhaps spruce twigs. Jeancon mentions, but does not illustrate, "birds perched on trees".[1]

TURTLE. What would seem to be part of a drawing of this animal is reproduced in fig. 81, *a*. It is from a sherd from the interior bottom of a small bowl. The identification is made on the analogy of undoubted turtles from Otowi and Poshuouinge which occupy like positions on Biscuit B bowls and which also have the edge of the body indicated by a double line with dots between[2]. What was meant to be represented by the creature in the bottom of the bowl in fig. 72, *c* is problematical. It is outlined by a double line with dots, as are the turtles above mentioned, but its head is bird-like and it seems to possess but two legs (or are they wings?).

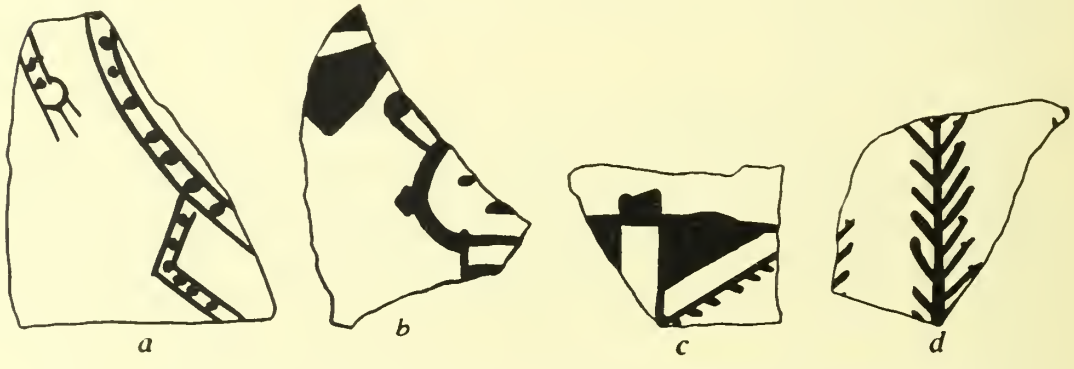


Fig. 81. Biscuit B. Sherds with naturalistic figures. *a:* Turtle. *b:* Human head. *c:* Butterfly. *d:* Vegetal motif (spruce twig?). Length of *a*, 5 inches.

BUTTERFLIES are found on only one of our complete Biscuit B specimens (fig. 72, *a*); a few sherds, however, carry bits of what may have been drawings of this insect. The only certain example is illustrated in fig. 81, *c*.

DRAGON FLY (?). In fig. 70, *b'*, the exterior design of an evidently late bowl on the interior of which there appear two bird figures, is a crude drawing of what may be a dragon fly. This tentative identification is made on the analogy of similar but

[1] 1923, p. 48.
[2] Kidder, 1915, fig. 15; Jeancon, 1923, fig. 8.

more convincing figures reproduced by Jeancon from the Chama and by Fewkes from the Hopi country.[1]

BIRDS (fig. 82) are more common than in Biscuit A. They are characterized by the representation of both mandibles of the bill, a trait which seems to distinguish them from Black-on-white birds (cf. fig. 18). They are often shown picking at a

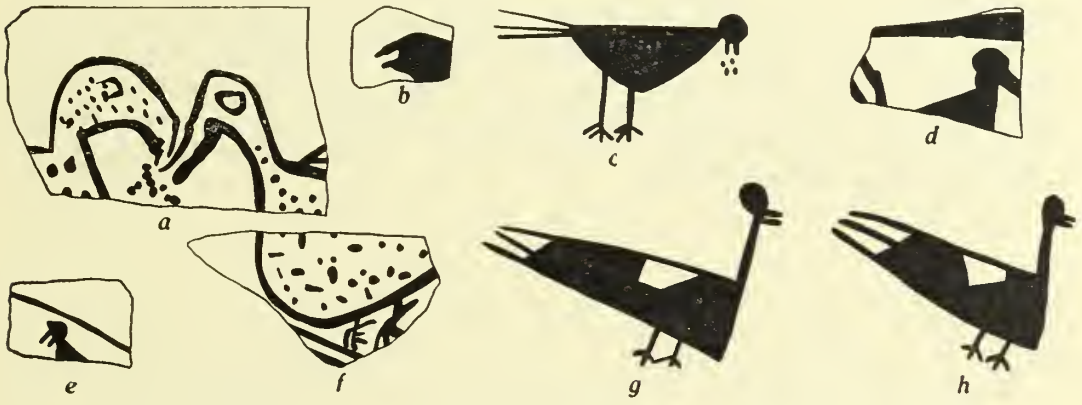


Fig. 82. Biscuit B. Bird representations. Note bifurcated beaks. Length of sherd *a*, 3½ inches.

group of small round objects, presumably seeds (fig. 82, *a*, *c*)[2]. Birds are usually painted in side view; the only case of spread-eagle depiction is illustrated in fig. 78, *e*. Most birds are in solid black, are small and appear as minor decorations either in reserved spaces in designs (fig. 70, *b*) or in the interior bottom of pendent triangle bowls (fig. 72, *b*). Occasionally, however, larger and rather more naturalistic birds with spotted bodies seem to have constituted the whole, or at least the principal

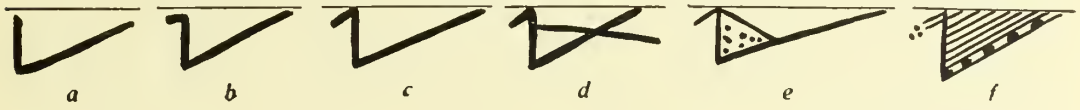


Fig. 83. Biscuit B. Series of decorations from bowl rims, showing possible development of bird figures (*d*, *e*, *f*) from simple geometric devices (*a*, *b*, *c*). Original figures of various sizes.

interior decoration of small bowls (see fig. 82, *a*, *f*, the two sherds there reproduced are so placed as to give an idea of the probable appearance of a complete bird—they emanate, however, from different bowls).

An interesting series is presented in fig. 83. Its elements are taken from the interiors of Biscuit B bowl-rims. It is of course an arbitrarily arranged rather than a

[1] Jeancon, 1923, pl. 42, *b*; fig. 12, *d*; Fewkes, 1910, fig. 61, *g*.
[2] See also Jeancon, 1923, fig. 33.

stratigraphically proved sequence, but it seems to show a development from plain check-marks (*a*)—which in turn may be derived from the zigzag of Black-on-white recurved bowl rims—to a convincing enough bird representation. A short line carelessly or accidentally added to the vertical element of the check-mark might well have suggested a bird's head; a second line (*d*) produces an even more realistic effect; and there can be no doubt whatever that *e* and *f*, which are certainly allied to the foregoing members of the series, were deliberately drawn to symbolize birds. The sequence, as was said above, is not stratigraphically established, but there is likelihood that the suggested metamorphosis of a purely geometric element into a semi-realistic one actually took place, for only those check marks with the simple addition of the "head" (*b*, *c*) are found in Biscuit A, the more elaborate forms *d*, *e* and *f* appearing in Biscuit B. Here we seem to have evidence of the "realization" of an originally pure geometric motif.

PART THREE

MODERN PAINTED WARE

Modern painted ware supplies the decorated element in the Modern ware-group, the other components being Polished red, Polished black, Plain gray, and Striated black cooking wares. Modern painted vessels were never very abundant, the need for water jars having apparently been filled to a large extent by Polished black ollas, and for food bowls by Polished red, Polished black and Plain gray receptacles. The general chronological position of the ware is clear enough. It succeeded Glaze VI some time after the Revolt of 1680, presumably about 1700, and it continued to be made until the abandonment of Pecos in 1838. Its life at the site was, therefore, a little less than a century and a half.

The excavations left no doubt as to the fact that Modern painted ware was of very late manufacture, but had there been no stratigraphic evidence to this effect, comparative study would have led to the same conclusion, for it is very closely allied to the nineteenth century decorated pottery of San Ildefonso, Santo Domingo, Cochiti and Tesuque.

The ware occurs in the form of bowls, ollas and (rarely) "soup plates". It is recognizable by its thickness and porosity and by its very distinctive designs in dull black paint on light-colored backgrounds. The only class with which it might possibly be confused is Biscuit, but from that it is readily distinguishable by the nature of its decoration, by the color of its paste, and by the fact that practically every Modern painted sherd bears some red slip, while red never appears on any form of Biscuit.[1]

Technology

Paste. Harder and less porous than Biscuit but, like Biscuit, light, "woodeny", and lacking ring when struck. The paste-material is relatively coarse-grained, so that broken edges are irregular. Tempering is not distinguishable with a pocket lens; bits of waterworn quartz sometimes appear, but are so rare as to seem accidental inclusions. Tiny flecks of some pure-white substance are sprinkled sparsely through the body of many pieces.

Color in cross-section is sometimes dull orange throughout, sometimes dull gray; most commonly, however, there is a very dark gray (almost black) central streak which changes to yellow and finally to orange toward the two surfaces. The

[1] There is practically speaking no literature of the eighteenth and early nineteenth century Modern painted ware of the Rio Grande. Nelson (1916, p. 176) provides a brief but accurate description of the material he collected in the Galisteo Basin, correctly identifies it as of historic date and points out its relationship to the decorated ware of the present-day pueblos of the region. In Kidder, M.A. and A.V., 1917, there is a short technological description of the Modern painted sherds from Pecos; in Kidder, 1924, pl. 39, *h* and pl. 40, *h*, two Pecos bowls are figured. Museum material is very scanty: at Andover are housed the Pecos specimens (almost entirely sherds); Nelson's Galisteo Basin collection is at the American Museum of Natural History; and in the survey collection of the Laboratory of Anthropology are sherds from a number of sites.

yellow-orange undersurface streaks vary in thickness according, apparently, to the intensity of the firing. In most fragments they occur under both surfaces, but are usually stronger under the outer; in some ollas, whose interiors received less heat than did their exteriors, the streak is present only under the outer surface.

Slips. Two slips were used, light-colored and red. Light-colored slip, always used as background for designs, is light bluff of a very characteristic shade. From this norm it varies to yellowish-grays, light-grays, grayish-yellows and creams to nearly white; and rarely, when it is very thin, the orange color of the paste shows through to give it a slightly pinkish cast. This slip is a relatively thick coat, clearly visible in section to the naked eye. It is soft, wears easily, and often scales off in small flakes. It is almost always finely and irregularly crackled. The surface of light-colored slip is usually well finished, it seldom shows traces, either of the mop or brush with which, presumably, it was applied; or of any rubbing implement. A few pieces are "slick" almost to glossiness, but none bear a true polish.

The red slip was applied in a relatively thick coat. Decoration was not applied over it.[1] It is of a fine rich, deep shade. It seems to wear somewhat better than the light-colored slip, seldom crackles, and never, apparently, flakes off. It was normally polished, the finest examples (such as the upper parts of certain high-necked ollas) being brought to a very high sheen. The marks of the rubbing stone can almost always be made out on the surface of red slip, in many cases so pronouncedly as to give the work a faintly rippled effect that is most pleasing; this rippling is very typical of the red parts of many Modern painted vessels. Red slip was used as pigment in the production of polychrome designs. When so employed it was not polished.

Although they are not slipped, there should here be described the surfaces produced by rubbing with the stone the bare paste of bowl-interiors and the exterior bottoms of bowls and ollas. The result of such treatment was the working up and even distribution of a very thin layer of fine clay, which has a much smoother texture than the untreated paste as seen, for example, in the interiors of ollas. The color of these surfaces is a very characteristic light brown. They are not polished, but are brought to an even, soft, smoothness agreeable to the touch. Marks of the rubbing-stone, applied in long, sweeping, horizontal strokes can usually be discerned. On such surfaces there commonly appear small and more or less faint red clouds due, it would seem, to remnants of red slip which have adhered to the rubbing-stone and have been worked into the substance of the paste during the smoothing process. Somewhat larger and better-defined red areas are evidently the result of accidental drops or splashes of red slip that have also been worked into the paste.

Pigments. The black paint used for decoration is a dead matte black which may be faint when brushed out thin, but is never rusty and seldom slaty in cast. It often crackles with the underlying slip, but never independently. It always lies as applied by the brush and does not "blurr" out from its lines or run on firing. Because of its close similarity in appearance to the black paint of San Ildefonso and other Rio Grande pueblos, it seems probable that it is of vegetable origin, presum-

[1] There are two sherds with black designs on red slip. These may possibly be trade-pieces, or may represent the very beginning of decorated redware, a style which occurs in later times in the Rio Grande pueblos.

ably it was prepared from "bee-weed" (*guaco*).[1] Red slip when used for paint always appears as a filler within black edgings (never unedged in normal Pecos ware). It is of a duller color than when it serves as a slip, probably because it was not polished.

Vessel-shapes

Bowls
- High rimmed bowls
- Plain rimmed bowls

Ollas
- Round bodied ollas
- High necked ollas

Plates

Miscellaneous

Bowls

HIGH RIMMED BOWLS (figs. 84, *c;* 86; 87, *d;* also frontispiece). This is by far the commonest form in which Modern painted ware occurs (about 60% of all the fragments). The pieces are deep, having a width-depth ratio approximating .56. The majority of examples are about 12 inches in diameter with capacity of 10 dry quarts

Fig. 84. Modern painted ware. Vessel shapes. *a:* High necked olla. *b:* Round bodied olla. *c:* High rimmed bowl. *d:* Plain rimmed bowl. Diameter of bowl *c*, 17 inches.

(11 litres), the extreme sizes being 8 inches and 17 inches; the latter has a capacity of 20 quarts (22 litres). The point of greatest diameter is usually at the edge of the rim, the shoulder occasionally protruding as far as the rim, but seldom beyond. These bowls are characterized by tall rims sweeping in a long, gentle curve from shoulder to edge (fig. 85, *a-h*). Rim heights range from ½ inch to 3 inches, the commonest height being about 1½ inches. While the rim is sometimes a trifle heavier than the body of the bowl, the thickening is never pronounced. The edge is gently rounded or flat with rounded corners.

The decoration of the high rimmed bowls is normally confined to the exterior of the rim from the shoulder to the edge, this surface being covered with light-colored slip to receive the painted figures (fig. 86). In a few cases where there is interior

[1] For description of the preparation and use of *guaco* paint, see Guthe, 1925, p. 25. Since the above was written Mr. Amsden has applied the Hawley tests to sherds of this ware and finds that the paint is carbon and therefore of vegetable origin. There is no admixture of iron as in Zuñi and Hopi paint, see Hawley, 1929, p. 738.

decoration the whole inside of the bowl is also slipped. The red slip occupies a band 1 or 2 inches wide just below the shoulder, and is also applied to the flat edge of the rim, but seldom runs down into the interior[1]. The interior (except when decorated) and the exterior bottom below the red streak were left unslipped, the bare paste, as mentioned above, having been worked down to an even smoothness.

PLAIN RIMMED BOWLS (figs. 84, *d;* 100) are, on the evidence of the sherds, only about one quarter as common as the high rimmed variety. They also form a less homogeneous group in size and in method of decoration. The range in diameter is from 4 inches to apparently almost 20 inches, with a mean somewhere in the neighborhood of 10 inches. The material is all so miserably fragmentary that the width-depth ratio can only be guessed at about .40.

The average piece appears to have been shallow, the sides evenly curving to the rim, which terminates in a rounding or flattened edge (fig. 85, *i*, *k*). There is occasionally a slight thickening at the rim (fig. 85, *j*), and even more rarely a slight outcurve. About 66 percent of plain rimmed bowl sherds show decoration only on the

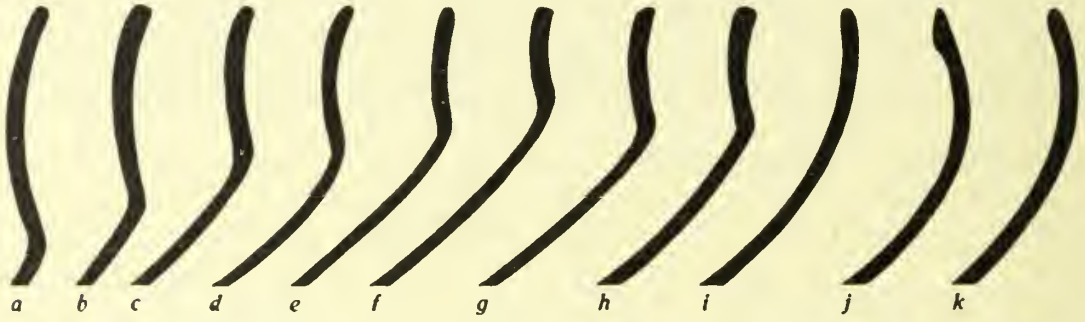


Fig. 85. Modern painted ware. Rim forms. *a-h:* High rimmed bowls. *i-k:* Plain rimmed bowls—the thickening of *j* is unusual. Height of sections about 3 inches.

interior, 17 percent only on the exterior, and 17 percent on both interior and exterior. Areas which were to receive decoration were covered with light-colored slip. In the case of bowls decorated within, this slip covers the entire interior to the edge of the rim; bowls decorated on the outside are treated with light slip down from the rim for 2 or 3 inches. Red slip is almost invariably applied to the edge of the rim, and (if the exterior is undecorated) runs down on the outside for 1 or 2 inches. If the exterior is decorated there is a narrow band of red slip below the ornamented zone (fig. 100, *b*). Exterior bottoms of practically all specimens, and the interiors of such pieces as are decorated only outside, are left in the paste.

OLLAS

Material for the study of Modern painted ollas is scanty (see figs. 84, *a*, *b;* 87, *a*, *b*, *c;* 88). Only five reasonably complete specimens were recovered, and two or three

[1] The statement made in a previous description (Kidder, 1917, p. 331) that the red slip underlies the light-colored slip on the decorated exterior surface of the rim, is erroneous. The red slip was applied on the edge, and in a streak just below the shoulder, and was polished; then the zone of light-colored slip was applied between, slightly overlapping the margins of the two red zones.

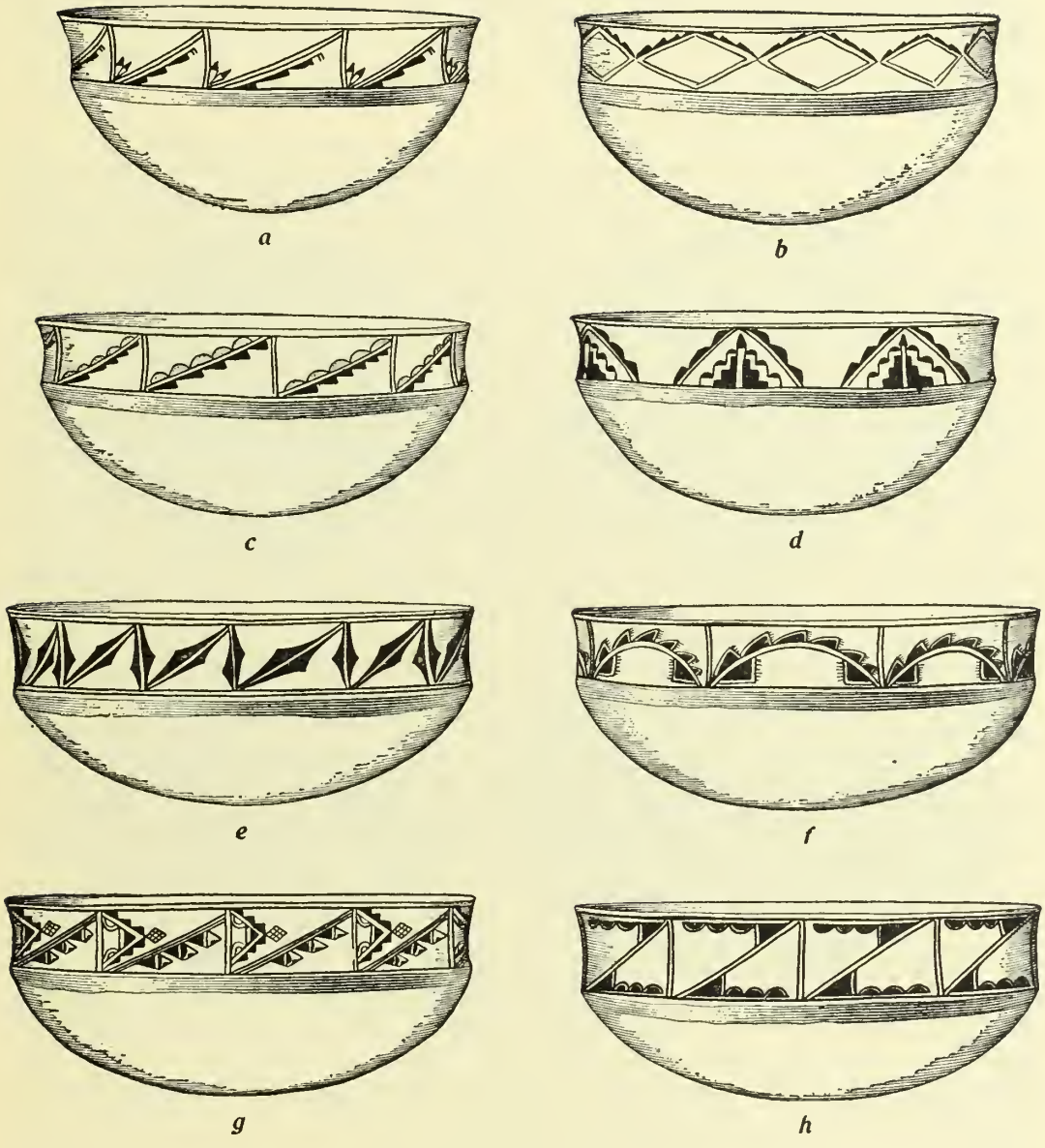


Fig. 86. Modern painted ware. High rimmed bowls. Drawn from fragments sufficiently large to permit confident restoration of the designs. The rim contours are correct, but the bowls may have averaged deeper than here shown. The parallel black lines just below the decorated zone indicate a narrow band of red paint. Diameter of the bowls 12 to 15 inches.

fragmentary pieces. Even sherds are relatively scarce; not more than 30% of the Modern painted sherds emanating from such vessels. This is presumably due to the use of Polished black ollas for water-jars during the modern period, sherds of these vessels being abundant. Such specimens as we have fall into two well defined classes, the round bodied and the high necked.

ROUND BODIED OLLAS (figs. 84, *b;* 87, *c;* 88, *a*) are almost spherical vessels about 12 inches high, with no shoulder, and with slightly outcurved rim. The capacity of our only complete specimen is 10 quarts (11 litres). They were coated with white slip and decorated from near the bottom to the rim. Red slip was applied to the edge of the rim and to its inner side; there was also a narrow streak about the lower body just beneath the decorated zone. The bottoms were left unslipped, the paste, as in bowl bottoms, having been finished with the rubbing stone.

HIGH NECKED OLLAS (figs. 84, *a;* 87, *a, b;* 88, *b*) have a small base, an underbody which widens rapidly to a pronounced and very low set shoulder, whence the upperbody rises as a long, gracefully proportioned neck to the relatively large orifice; height of vessels about 11 inches. The rim is sharply outcurved. Capacity about 9 quarts (10 litres). They are, from the point of view of decoration, divisible into two classes: the light-slipped, and the red-slipped. The former were slipped from the flaring shoulder to the rim, and that whole large surface served as the decorative field (fig. 88, *b*). The edge and the interior of the rim, and a streak just below the decorative field were treated with red slip. The red-slipped variety had only a narrow band of light-colored slip encircling the flaring shoulder (fig. 87, *a, b*; also frontispiece); the whole high upperbody, and the underbody almost to the very base being covered with red slip, carefully and evenly applied and, in most cases, beautifully polished.

On the basis of sherd counts, round bodied ollas were only about half as common as the high necked variety. Of the high necked type, red-slipped specimens seem to have been somewhat more abundant than light-slipped. All modern ollas, apparently, had recurved bases (see dotted lines, fig. 84, *a, b*).

PLATES

These very shallow bowls with wide, flaring, almost horizontal rims, were relatively common during the Glaze VI period. They were rarely made in Modern painted times. We have but one whole specimen and five sherds. The average diameter is about 8 inches, depth 1¾ inches. Decoration is either "all-over" the interior or in the form of a narrow band about the periphery. In the latter case the bowl of the plate is covered with red slip; red slip also covers the under side of the flare, the exterior bottom being left in the paste.

MISCELLANEOUS

A small two-handled jar was found in a cache of ceremonial material in the North Quadrangle. There is also in the collection a fragment of a flat backed canteen, the back and sides polished red, the swelling front covered with light slip and decorated (nature of design not ascertainable). Finally, there is a heavy handle,

Fig. 87. Modern painted ware. *a*, *b:* High necked ollas, the upper parts are covered with beautifully polished red slip (see frontispiece). *c:* Round bodied olla. *d:* High rimmed bowl. The two latter specimens might well be mistaken for vessels made in recent years at Santo Domingo. Diameter of *d*, 16 inches.

apparently broken from some sort of dipper. These three specimens represent the only departures from the standard bowls and ollas. Pecos potters were never given to virtuosity in vessel forms; their conservatism in this regard evidently reached its maximum in the late period.

Decoration

Although most of the designs on Modern painted ware are in essence geometric, they exhibit a freedom which marks a radical departure from the severely cramped canons of Glaze ornament. This lack of restraint is shown in the great variety of the decorations, in the lavish use of curvilinear motifs, and in the appearance of what seem to be highly conventional symbolic figures, taken over perhaps from altar or mask painting, or from pipes. Naturalistic representations are, however, of the

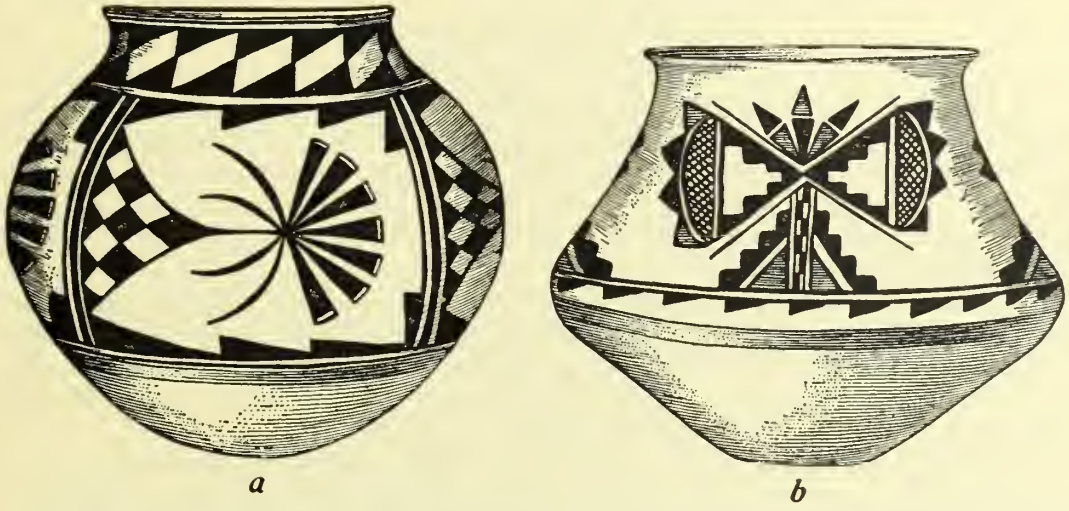


Fig. 88. Modern painted ware. Ollas drawn from fragments sufficiently large to permit accurate restoration of shape and decoration. *a:* Round bodied type. *b:* White slipped variety of high necked type with polychrome decoration. Height of *a*, 11½ inches.

greatest rarity, the birds and floral elements, so common on nineteenth century Pueblo pottery, being almost entirely lacking.

Brushwork is normally sloppy, the decorator evidently having relied more upon the pleasing contrasty effect of her lacy black designs on their light background, than upon evenness and trueness of line. It is obvious that outlines were quickly run in with long sweeping strokes of a narrow brush and that fillings and dottings were added without any particular attempt at smoothness or accuracy. The decorations of Modern painted vessels were applied in two ways: in bands, or in the "all-over" manner. Bands were used on the exteriors of high rimmed bowls (fig. 86) and the protruberant shoulders of red-slipped high necked ollas (fig. 87, *a*, *b*), in both of which cases they were of necessity narrow; broader bands were used on the bodies of round bodied and some light-slipped, high necked ollas. "All-over" patterns occupy

the interiors of bowls; queerly enough, there is no example of a true band in a bowl interior in the entire collection.

BAND PATTERNS

Data for the study of band decorations are abundant, because the high rimmed bowls were by far the commonest single type of Modern painted vessel, and also because the patterns are usually simple repetitions and so can confidently be reconstructed even from small sherds. Typically, there is a single thin banding line at the bottom (very rarely supplemented by a narrow framing line) drawn at or just above the junction of the red and light slips; a single line almost invariably terminates the pattern at the rim. The line-break is so rare as to seem accidental where it does occur. The band may take one of three forms:

Continuous zigzag
Repeated figures, unpaneled
Repeated figures, paneled

ZIGZAG BANDS of typical form are illustrated in fig. 89. The simplest examples are pairs of plain zigzagged lines (fig. 89, *a*); these are less common than zigzags enriched by variations in line width (*b*) and number (*e*), by dotting (*c, d, g, h*), or by ticking (*f*). Also common are zigzags whose upward-opening angles are embellished with small secondary figures (*i, j*). Two sets of zigzags often cross each other to produce diamonds (fig. 91, *a*).

REPEATED FIGURE BANDS UNPANELED. The commonest device employed in this system of decoration is a semi-circular (fig. 90, *f, h, j*) or triangular (fig. 86, *d;* 90, *l*) figure, the exterior of which is edged with the small repeated elements shown in fig. 92. The inside may be similarly treated (fig. 90, *j*), but more commonly it is filled by a curved (fig. 90, *f*) or terraced (fig. 90, *l*) figure.

REPEATED FIGURE BANDS PANELED. Paneled patterns make up the commonest single class. The band is divided into rectangular panels by pairs of narrow vertical lines (more rarely by sets of three lines). The resulting spaces are decorated in a great variety of ways. They may be filled by triangular or semi-circular (fig. 86, *f;* 90, *e, g, i, k*) units similar to those of the unpaneled decorations described above; or they may contain fairly elaborate terraced designs (fig. 90, *g*). The usual treatment, however, was to bisect the panels by a pair of oblique lines running from one of the lower corners (usually the left-hand) to the opposite upper corner (figs. 86, *c, e, g, h;* 91, *g, i, j, k, l*), and to draw along these lines series of the small triangular and bubble-like units illustrated in fig. 92. The two sorts of units are usually opposed or contrasted, the bubble-like ones being strung along the upper line, the triangular ones on the lower line (figs. 86, *c;* 91, *g, k*). Occasionally triangular units may appear both above and below (figs. 86, *f;* 91, *i*), but seldom is a bubble-like unit placed on the lower side of a line, either in the obliquely divided panels or in the large triangular or semi-circular figures. This upper position may possibly mean that the bubble-like units were intended to symbolize clouds. They are identical with the short curved lines so often erected upon each other to represent clouds in later Pueblo symbolism; they form part of what appear to be cloud-patterns on certain

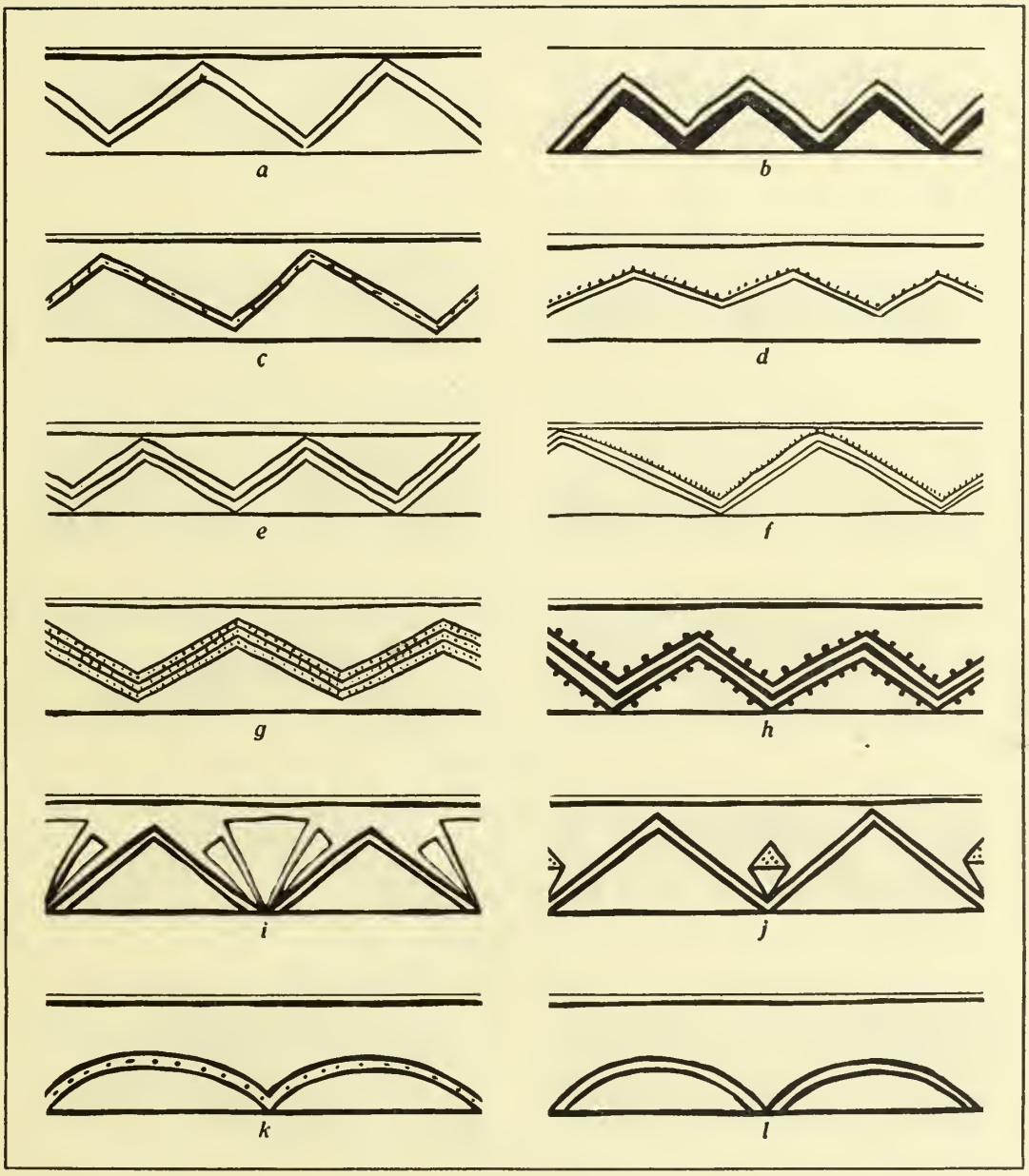


Fig. 89. Modern painted ware. Band patterns: zigzags and allied arrangements. The bands average 1½ inches in width.

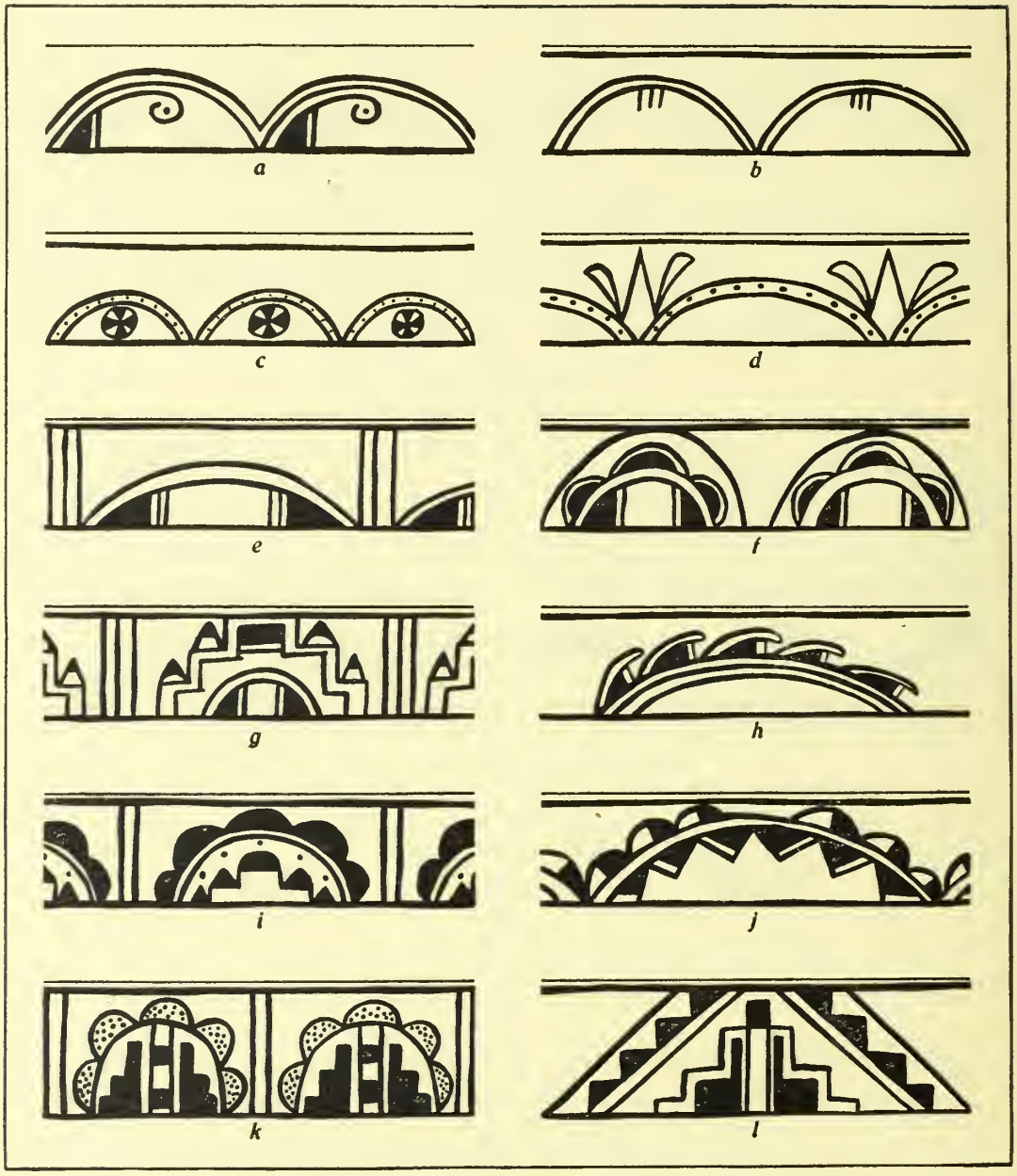


Fig. 90. Modern painted ware. Band patterns, repeated figures, unpaneled (*a-d, f, h, j, l*); and paneled (*e, g, i, k*). The bands average 1½ inches in width.

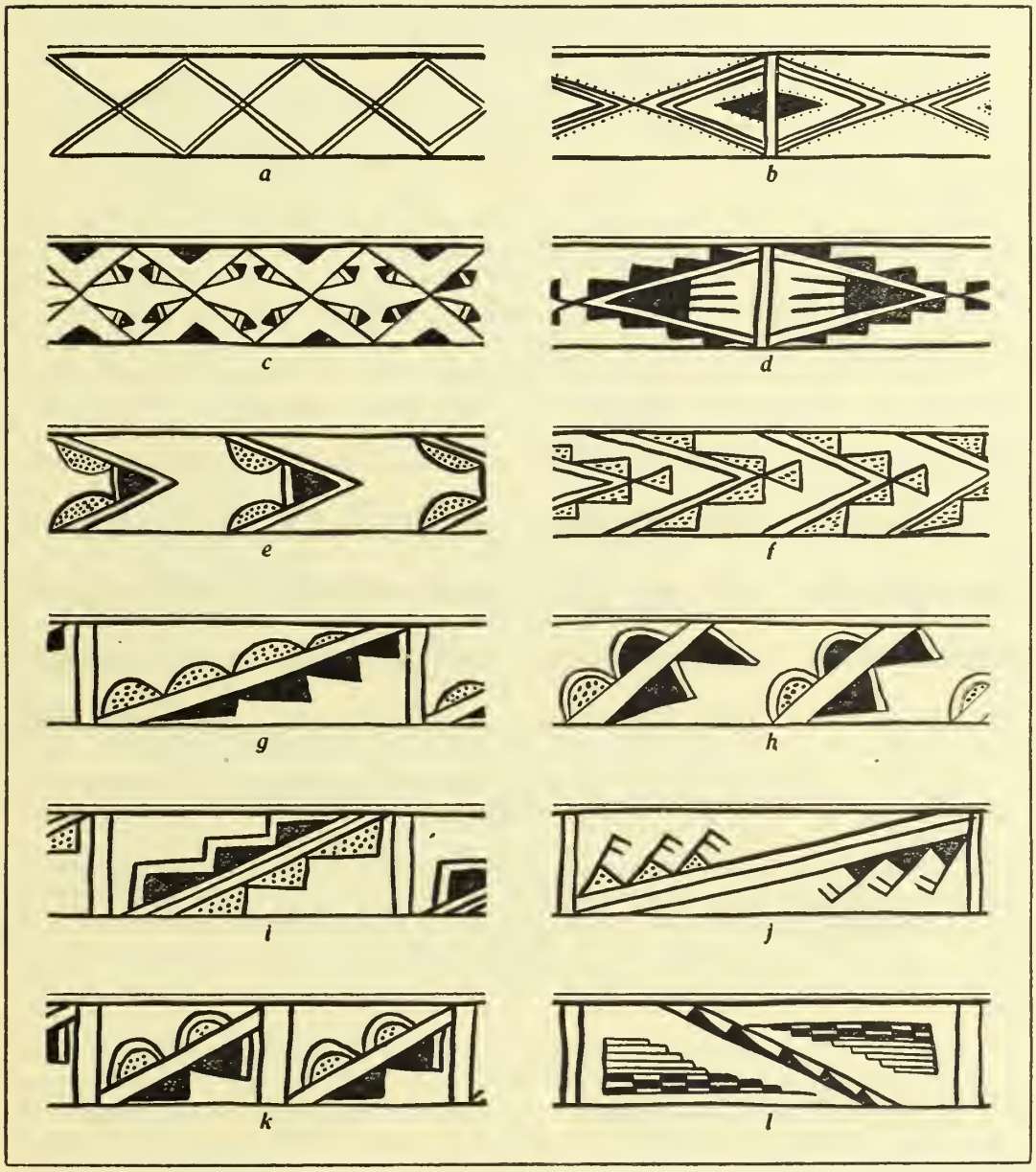


Fig. 91. Modern painted ware. Band patterns: based on double zigzag (*a*, *c*); paneled with X subdivision (*b*, *d*); chevron arrangement (*e*, *f*); panels with oblique subdivision (*g*, *i-l*). The bands average 1½ inches in width.

sherds in the present collection (fig. 93, *f, h, i*), and are also identical with the symbols employed to represent clouds in the incised designs on pottery pipes as far back as the early Glaze V period at Pecos.

UNITS USED IN BAND DESIGNS. Mention has been made of small bubble-like and triangular units. These are, so to speak, the hallmark of Modern painted decoration. As is brought out in fig. 92, and in other illustrations, they always occur in reiterating series. They are placed on lines or on the edges of large figures. In size and proportion they are remarkably uniform, but in the details of embellishment they exhibit many varieties. Dotting is very common. Perhaps the most abundant and most characteristic treatment is the cutting off and blacking in of halves of the "bubbles" (fig. 92, *h, i*), and the blacking in of two-thirds or three-quarters of the acute angle of the triangles (fig. 92, *p, r*).

Probably to be classed with the triangular unit is a similarly shaped figure whose upper side is produced beyond the triangle proper and bears at its end two

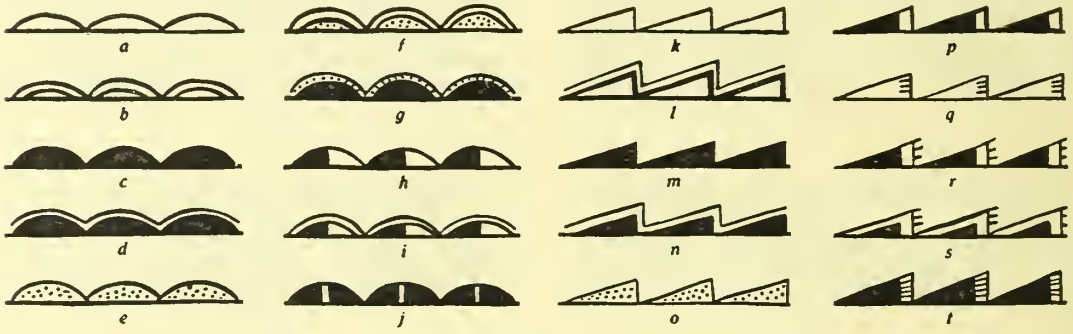


Fig. 92. Modern painted ware. Small units employed in series to embellish edges of larger figures; they are highly characteristic of the Modern painted system of decoration. About one-half natural size.

(rarely three or four) short projections at right angles to it (fig. 94, *a-i*). It is possible that they are highly conventional bird symbols. They are usually painted in reiterating series (figs. 91, *j;* 94, *d, e, f, h, i*), though they are occasionally enlarged and used singly (fig. 94, *a*) or in pairs (fig. 94, *b*; probably also in *c, g*). The dotting often used in connection with these "birds" (figs. 91, *j;* 94, *b, d, h*) may be of symbolic significance.

Another unit which would also appear to fall into this group is illustrated in fig. 95, *a-d*. It occurs in serial repetition along lines or the edges of larger patterns. Its "body", so to speak, is triangular; its terminations are either angular or curvilinear. In certain cases (fig. 95, *a*) the filling of the end suggests the "feather symbol" of Chapman[1]; and it is apparently akin to the "feathers" shown in fig. 96 and in fig. 94, *j, l, m* and perhaps *o;* and also fig. 97, *d*.

Figure 96 makes clear the essential qualities of the "feather". It is of elongated form, with angular or rounded termination, part of which is blacked in to represent, in Chapman's opinion, the black tip of the eagle tail-feather. Dotting is again an associated trait (figs. 96, *c;* 97, *d*). Dotting, it will be remembered, seemed to be

[1] Chapman, 1927.

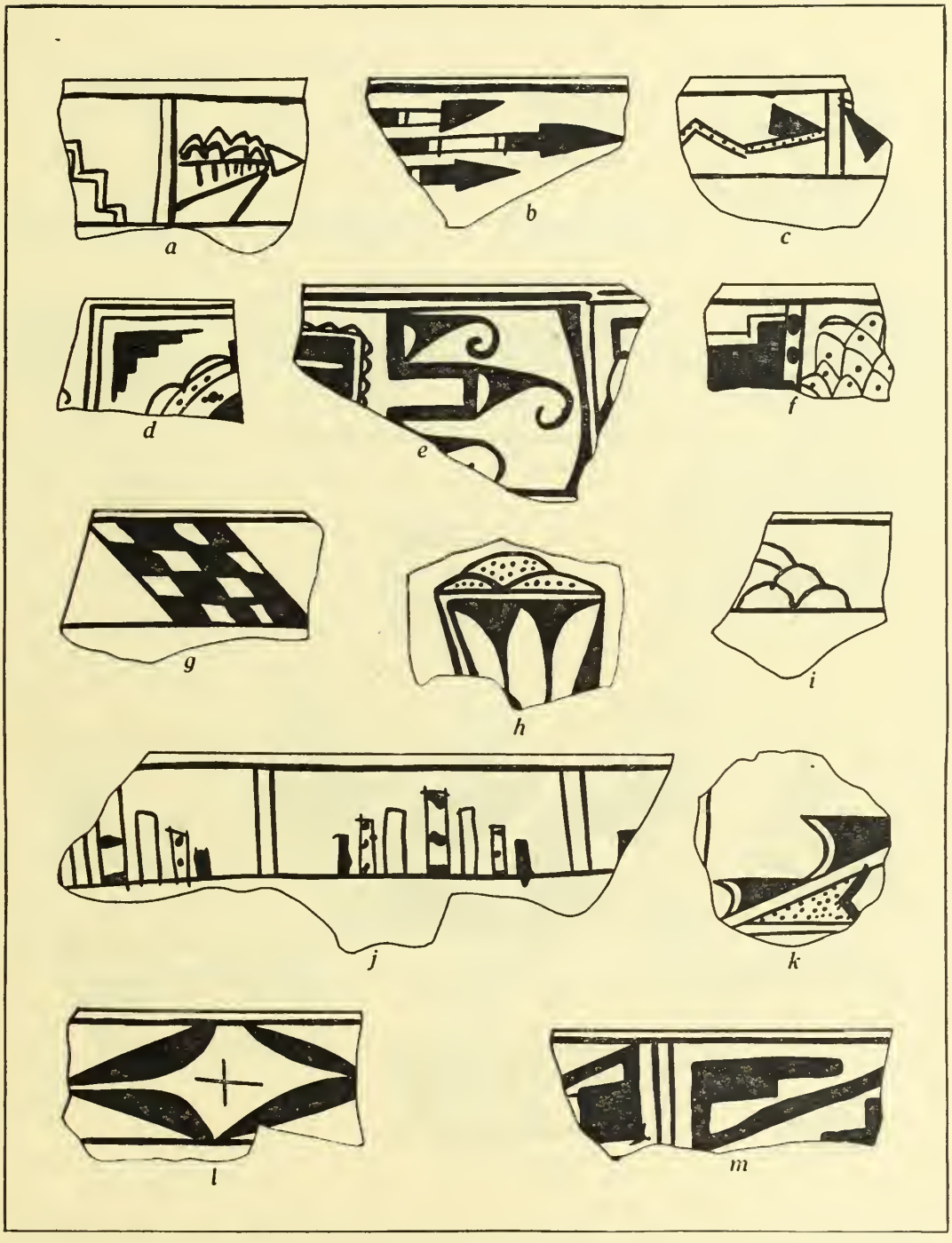


Fig. 93. Modern painted ware. Sherds from high rimmed bowls bearing unusual decorations. The key figure (*d*, *m*), the scroll (*e*), and the checkerboard (*g*) are extremely rare. Also rare are the representations of clouds (?) shown at *f*, *h*, *i*. Length of *j* about 6 inches.

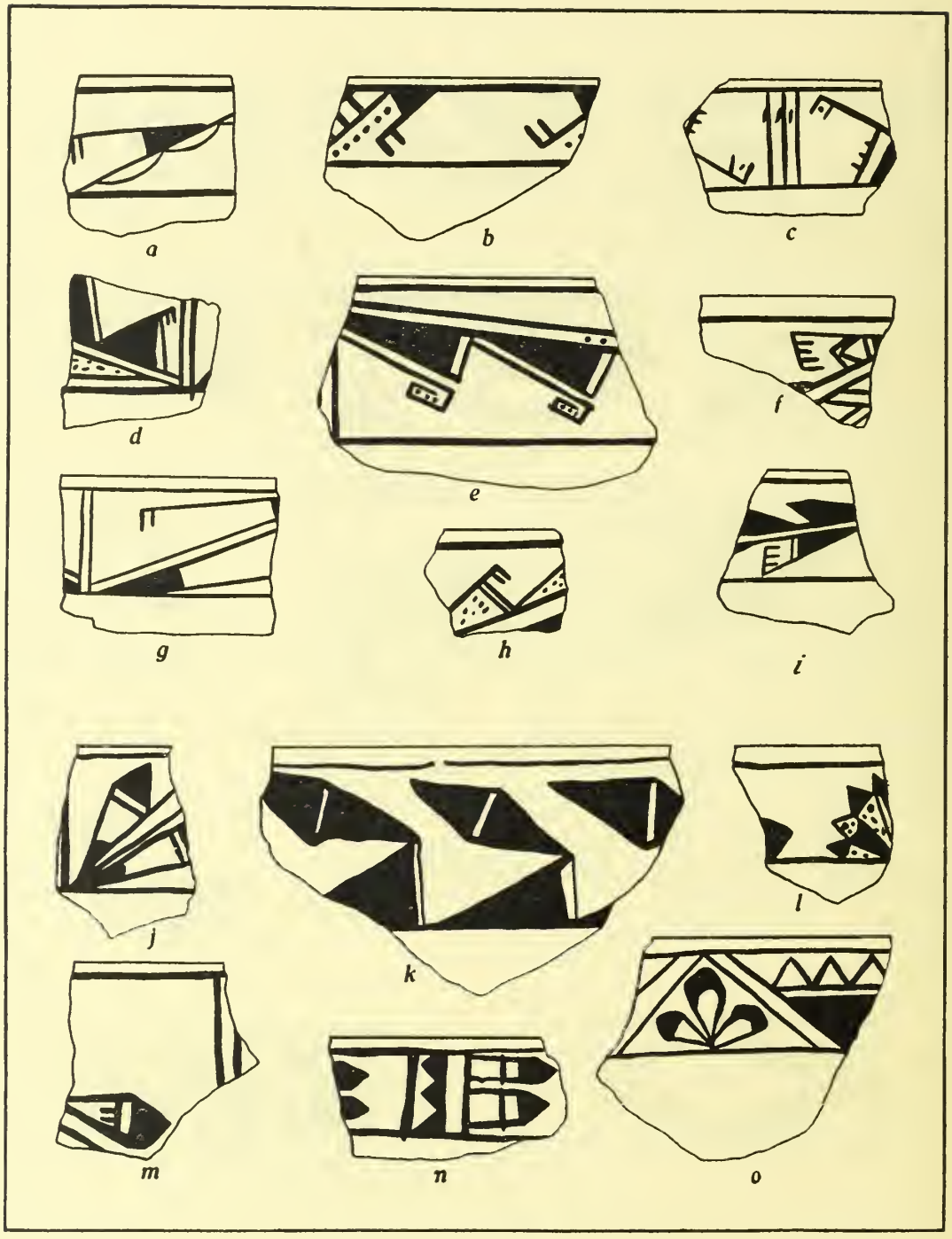


Fig. 94. Modern painted ware. Sherds from high rimmed bowls illustrating typical motives. *a-i:* Small triangular figures with one produced side terminating in short lines at right angles to it; these may perhaps be bird symbols. *j-o:* Small figures with triangular ends; it is possible that they symbolize feathers. Length of *k*, 3½ inches.

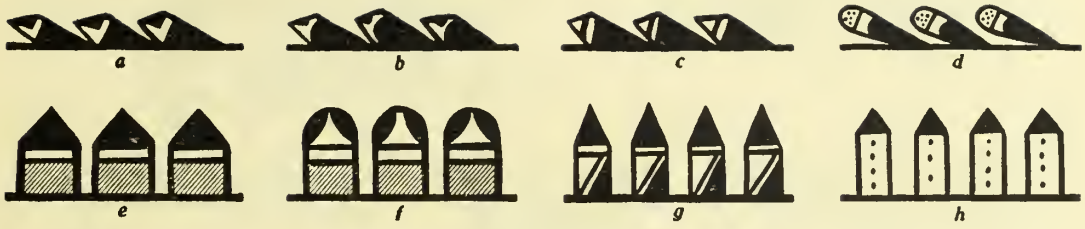


Fig. 95. Modern painted ware. Small repeating units (feather symbols?) used to embellish larger figures. About one-half natural size.

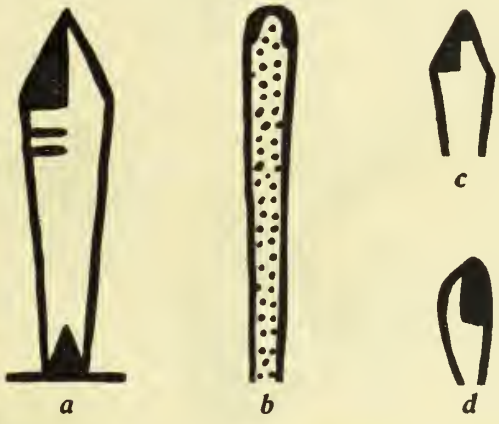


Fig. 96. Modern painted ware. Figures thought to be conventional representations or symbols of eagle tail feathers. About one-half natural size.

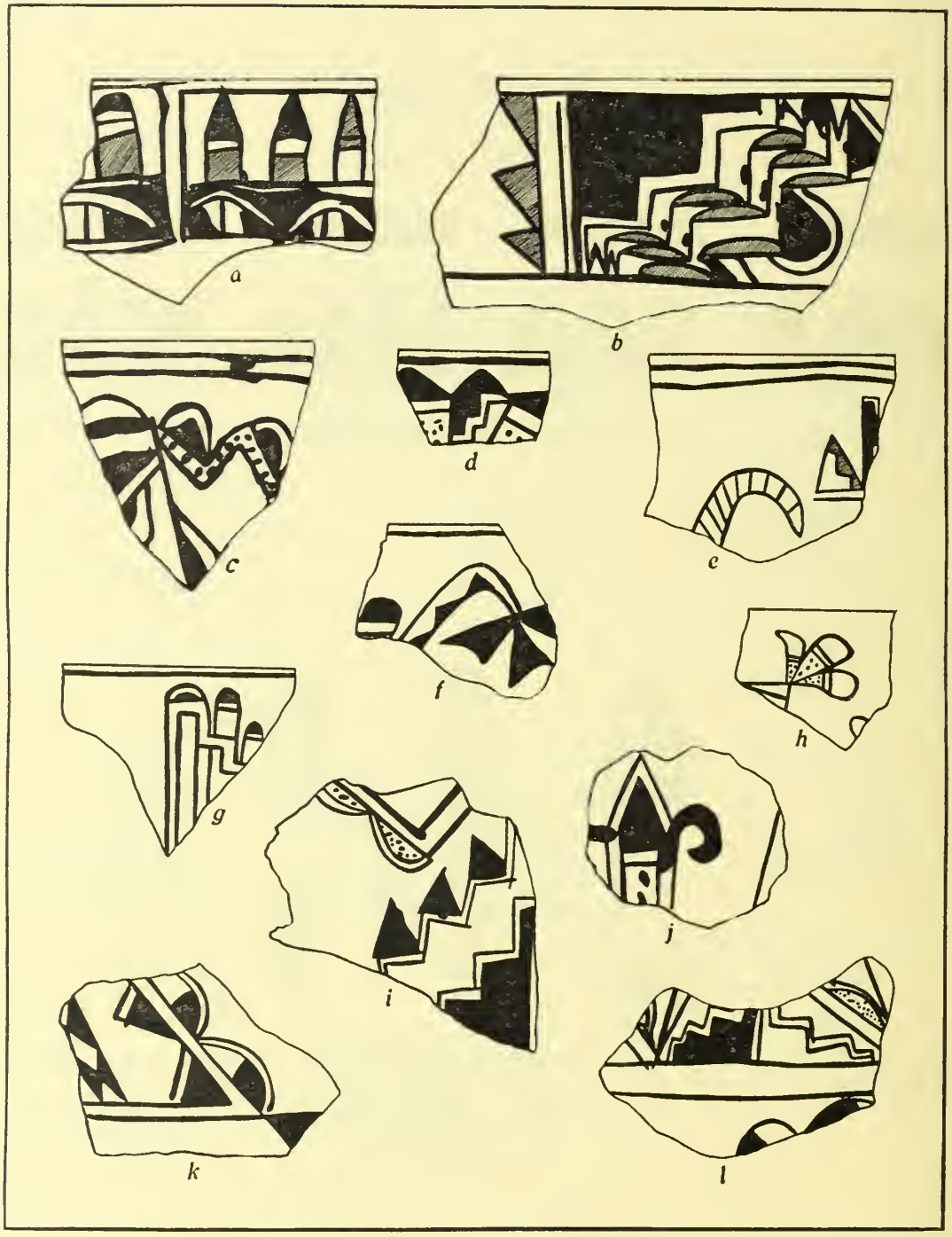


Fig. 97. Modern painted ware. *a*, *b:* Sherds from high rimmed bowls with polychrome decoration (the red portions are shaded). *c-e:* Sherds from interiors of plain rimmed bowls with parts of all-over patterns. *f-l:* Sherds from high necked ollas with white slip. Length of *b*, about 5 inches.

associated with the cloud and the bird; here it is linked with the feather. One seems to perceive a sky, bird, feather complex.

Still another unit which should be considered here is shown in figs. 95, *e–h*; 97, *a*. It has a rectangular base and triangular or rounded termination. It usually stands vertically and occurs in series. Its possible affinity to the little triangular and rounded erections on the steps of certain terraced figures (figs. 90, *g*; 97, *b*, *i*) should be noted.

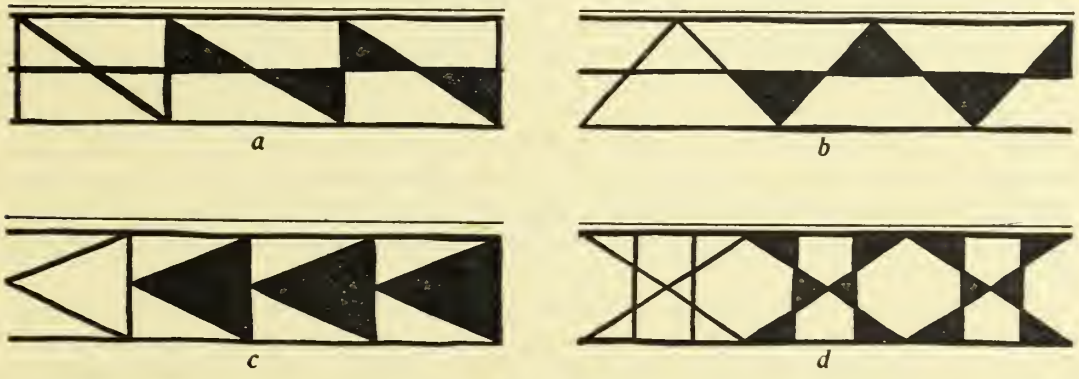


Fig. 98. Modern painted ware. Band patterns from high rimmed bowls. This severely geometric style of decoration is still in use at the pueblo of Santo Domingo. Width of bands about 2 inches.

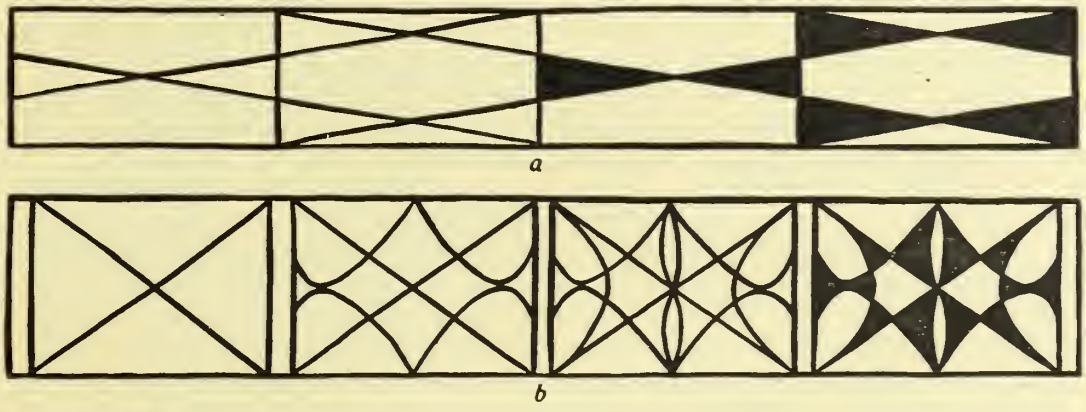


Fig. 99. Modern painted ware. Analysis of Santo Domingo-like band patterns. *a:* A preliminary X-layout, each X covering three panels, thus producing alternating panels. *b:* A complex development of the X-layout of the panel; the pattern as it appears on an olla may be seen in fig. 87, *c*. Diagram.

SANTO DOMINGO-LIKE BANDS. Quite different in conception from the designs so far considered, are the patterns illustrated in fig. 98. They occur on the exterior of high rimmed bowls and all, or nearly all, of the round bodied ollas are decorated with them. They are purely geometric, and were made by simple preliminary layings off of the band, followed by blacking in certain of the angular spaces produced by line-intersections (fig. 99). Narrow banding lines are used and framers are lacking. The patterns are sometimes paneled, sometimes not. The style is practically

identical with that of late nineteenth century and present day Santo Domingo pottery, but the pieces are apparently as old as any of the Modern painted ware from Pecos; and while examples are less common than those of the less severely geometric types, they are not rare enough to be considered trade specimens. Technically and in shape, the vessels which bear them depart in no way from local standards.

ALL-OVER DESIGNS

Material for the study of this class is very scanty; first, because all-over patterns were used only in the interiors of a small percentage of the relatively uncommon plain rimmed bowls; second, because one cannot reconstruct with any assurance of accuracy such large designs from the small fragments which make up most of the collection. The general arrangements, therefore, are obscure. They were evidently elaborate, but it is obvious that they were made up of the same units and figures that were used in the narrow bands, and brushwork and general style are identical. Certain sherds are illustrated (fig. 97, *c*, *e*, *i*, *k*, *l*) in which we see the familiar bubble-like and triangular units in series (*k*), the terraces with little triangles on the steps (*i*), etc.

We have only a few hints as to layout. One partly restorable bowl (fig. 100, *a*) has elaborate figures arising from the sides and corners of a square centre-panel, which was itself decorated, but this part of the specimen was too badly worn to permit study of its design. Several sherds show this to have been a common arrangement. Others indicate that a round center was sometimes used, as in the probably ceremonial bowl illustrated in fig. 101. In the case of high necked ollas large, elaborate designs in the all-over manner seem to have been based on a line drawn about the shoulder, and to have extended nearly to the rim (fig. 88, *b*).

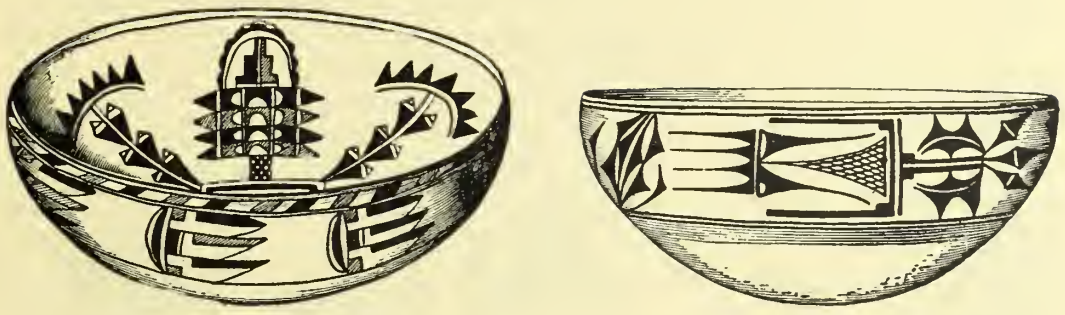
It is most regrettable that so little can be said as to the all-over patterns. They appear to have been elaborate and unusually handsome, and to have been painted with a freedom and "dash" all too uncommon at Pecos.

POLYCHROME DESIGNS

Patterns enriched by red fillings (no independent, unedged, red unit appears in native Pecos pottery), are very rare, only some two percent of all the sherds collected belonging to this class. There actually obtained an even smaller percentage, for while a certain number of battered or otherwise valueless Modern painted sherds were discarded in the field, all polychrome pieces were saved. The decorations differ in no way from the usual band and all-over arrangements, but they tend to be somewhat more ornate (fig. 97, *a*, *b*). My impression is that polychromy was a rather late development, and while the stratigraphic evidence is not as clear as one could wish, it is certain that polychrome pieces were relatively commoner in the debris just north of the Great Quadrangle (a very late deposit) than they were in the general digging in the east rubbish heaps.

LIFE-FORMS

As was said above, naturalistic representations are very rare. Possible plant motifs may be recognized in the trefoil figure shown in fig. 97, *f*, and possibly in the



a *b*

Fig. 100. Modern painted ware. Plain rimmed bowls restored from sherds. *a:* Polychrome designs, the exterior a band of repeated figures, the interior an all-over decoration made up of the same units generally employed in bands (the red is shaded). *b:* Bowl with undecorated interior; the large, complex figures of the exterior band appear to be typical of this sort of bowl. They do not occur upon high rimmed bowls. Diameter of *a*, about 16 inches.

a *b*

Fig. 101. Modern painted ware. Decoration of a small, probably ceremonial, bowl. *a:* Interior. *b:* Exterior. Diameter 8 inches.

large spreading pattern on the round-bodied olla illustrated in fig. 88, *a*. Almost surely a flower is the rosette on the left of the sherd in fig. 102, *b*, as there is a butterfly on the same piece (extreme right), and this quite natural combination occurs elsewhere in Pueblo art of the late prehistoric and early historic periods. Birds, small and highly conventional, appear on another fragment (fig. 102, *a*); the arrow pointing toward them would appear to indicate the hunting concept. The only other life form is a strange creature (fig. 102, *c*) of which unfortunately only a part was

Fig. 102. Modern painted ware. Sherds with naturalistic figures from white slipped high necked ollas. *a:* Birds and arrow. *b:* Flower and butterfly. *c:* Bird (??). Height of *a*, 5 inches.

recovered. One of the most tantalizing aspects of excavation is the finding of such incomplete pieces.

To summarize, one may say that the characteristics of the Modern painted decorative system are: fine-line designs in bold, free, but careless brushwork; common use of curvilinear patterns, both in the bands and in "all-over" treatments; abundance of repeating small elements, such as "bubbles", little triangles, etc.; employment of dots as space-fillers and between and along lines. Equally characteristic is the very great rarity of hatching, crosshatching and checkerboarding, of the scroll, and of the stalked key figure (the only cases of the two latter in the collection are shown in fig. 93, *e*, *m*).

PART FOUR

CONCLUSIONS

General inferences as to the technical, artistic and archaeological significance of the pottery of Pecos must naturally be deferred until all the ceramic material from the site has been described. But we are now in possession of data concerning the Dull-paint wares, and as these had singularly little influence upon, and were hardly, if at all, affected by the Glaze wares, it is possible to proceed to consideration of their history and to draw certain conclusions as to their exterior relationships. It may be well to preface the discussion by summarizing briefly our present information regarding the archaeology of the Rio Grande drainage in New Mexico.

This great territory appears to have played little or no part in the origin or early development of Pueblo culture. Only in the extreme south have remains been found which indicate the former presence of a culture on the Basket Maker II horizon.[1] Their age, relative to northern Basket Maker II, is not known, nor is their morphological significance clear. At all events, the people who produced them did not pass on into the Basket Maker III stage marked by pottery making and house building. Those fundamental steps, so essential for all later progress, were taken in the San Juan, which region accordingly first became, and until the close of Pueblo III continued to be, the nucleus and centre of diffusion of Pueblo culture traits. During the time that Basket Maker III was germinating in the north no progress, as far as we now can see, was being made in the Rio Grande; its drainage, I imagine, was occupied throughout that period by semi-nomadic, semi-agricultural tribes. The ceramics and architecture of Basket Maker III did not seep into the Rio Grande. At least, there have not yet been reported any sites with the typical pottery of that stage. But it would not be surprising to find a fringe of such sites in the extreme northwestern part of the region, in the Chama, for instance, or the Jemez, or the western affluents of the Puerco.[2]

In the San Juan, Basket Maker III was succeeded by Pueblo I, a culture fostered, apparently, by an immigrant people, but built upon foundations already firmly laid by their predecessors. And now there began to be percolations into our area. Although Pueblo I remains are seemingly not abundant, there is an almost obliterated ruin, with pottery which looks to me typical of Roberts' eastern wing of Pueblo I, on the Fort Marcy hill in the outskirts of Santa Fe; Dr. Mera tells me that there are others in the Tesuque valley; I have seen one on the Puerco northwest of Albuquerque. Further exploration will doubtless reveal many more, particularly in the western tributaries of the Rio Grande. To the east of the river, Pueblo I certainly did not extend to any great distance. In the northeast its progress, like that of later Pueblo cultures, was barred by mountains; the Pecos valley, the open

[1] Near Las Cruces, New Mexico (explorations of Mr. and Mrs. C. B. Cosgrove for the Peabody Museum); in vicinity of El Paso, Texas (Roberts, 1929 b).

[2] E. H. Morris told me some years ago of a Basket Maker III ruin at La Cienaga, near Santa Fe; Dr. Mera has recalled it to my attention.

country to the east and the plains of southeastern New Mexico have yielded no trace of Pueblo I; it is to be supposed that they were still in the hands of nomads.

Little is known of Pueblo II, even in its San Juan homeland. Still less in the Rio Grande. I used to suppose that the small Black-on-white ruins of the Pajarito and those of eastern New Mexico must have been built in that period.[1] But their pottery is similar to, and apparently not much earlier, than that of larger Black-on-white communities, such as Forked Lightning, Tecolote and the Greenlee ruin at Abiquiu which are surely Pueblo III because not only do they produce fragments of vessels traded from Mesa Verde and Little Colorado groups known to belong to Pueblo III, but their own wares prove, on close inspection, to be peripherally crude rather than genetically primitive. Again we must infer that the Rio Grande lagged; and that during Pueblo II such people as were in the area possessed a culture little, if at all, surpassing the standards of Pueblo I.

The above mentioned small villages probably came into being in Pueblo III. They seem to have been due to migration as well as to the expansion of groups already resident; they are found in practically every part of the Rio Grande area that has been explored; extend considerably to the east of Las Vegas and southeast of Pecos for a distance not yet determined. What part of Pueblo III witnessed the postulated influx of population is not clear; I am inclined to think it was about the middle. The newcomers were evidently not immigrants from one of the great centres, Mesa Verde, for instance, or the Chaco, for none of the more marked architectural or ceramic characteristics of these or other known centres of Pueblo III specialization was introduced[2]. But they may, as Mr. Amsden has deduced from his study of the Black-on-white ware, have been people who in Pueblo II had carried a relatively undifferentiated culture into the northern part of the Rio Grande, kept it fairly pure there during the first part of Pueblo III, and then spread south and east. This is more or less guesswork, but it fits the observed facts rather better than any other supposition. The final test of the hypothesis will have to await much fuller knowledge of the materials, particularly the Black-on-white ware, of the presumed upper Rio Grande way-station and careful investigations in the Pueblo II ruins of the San Juan, together with thorough and searching analysis of Rio Grande Black-on-white decoration.

The small ruins which have just been considered are those of the Pajarito, Galisteo Basin, Pecos country and adjacent territory. What was going on further to the south and to the west during Pueblo III we do not know. Little Colorado cultures may have invaded the San José and the Puerco; Upper Gila and Mimbres influence may have reached the Rio Grande in southern New Mexico. East of the river and south of the Galisteo Basin there appears a very distinctive Black-on-

[1] Kidder, 1924, fig. 25, p. 127. The range of what I considered "Early Pueblo" (Pueblo II of the Pecos nomenclature) is there given.

[2] A possible exception is the Little Colorado Red-on-black pottery with white exterior decoration. So many sherds of this ware are found at Forked Lightning as to suggest local manufacture. Other contemporaneous Little Colorado wares, however, do not appear; nor any other recognizable traits of Little Colorado culture. Hence the above-mentioned sherds, if they are not derived from traded pots, appear to indicate the eastward extension of a ceramic style, rather than an influx of people. In either case their chronological significance is the same.

white ware which Dr. Mera and I have called "Chupadero", whose range, relative age and genetic affiliations have not yet been worked out.

In the Pecos-Galisteo region, however, and along the Chama there is evidence that the lesser villages were abandoned and that there was a progressive gathering together of people into larger pueblos built in more readily defensible situations. Much territory, including that east of Pecos, was given up altogether. The first phase of this coagulation is seen in the growth of the Forked Lightning community and of that at Rowe; the second is marked by the founding of the settlement on the Pecos *mesilla*. Pueblo III was drawing to a close, and still the Rio Grande was culturally backward.

With the abandonment of the San Juan the Classic period of Pueblo history came to an end. The ceramic styles typical of Pueblo III, Black-on-white and Corrugated, ceased to be made. Whether or not they persisted for a time in the upper Gila and the Rio Grande, we do not yet know, but at all events they did not last long, and it is probable that by the middle of the fourteenth century the typical wares of Pueblo IV had reached full flower in the Little Colorado and Rio Grande drainages, the two general regions which from then on were to be the seat of Pueblo development[1]. With the Little Colorado we are not now concerned. In the Rio Grande, Pueblo IV saw the crystallization of a new culture characterized by straggling, uncompact villages made up of ranges of rather long, rectangular rooms of strikingly uniform dimensions, the ranges tending to enclose large courts[2]; kivas were round, subterranean, unbenched, with eastward opening ventilator (not southward as in the San Juan); the metate was untroughed; axes were of fibrolite, spirally grooved; the pottery was uncorrugated (or blind corrugated) Culinary wares, Glaze wares, Biscuit wares, local occurrences of Incised and Jemez Black-on-white.

The territory occupied by the above-described culture comprised, roughly speaking, the valley of the Rio Grande and the lower valleys of its principal affluents from about San Marcial, New Mexico, to the Colorado border; as well as the Manzano country and the upper Pecos valley.

What elements went into the making of the Rio Grande culture of Pueblo IV? It presumably drew largely from already existing Pueblo III groups, for village arrangement, and room and kiva form seem to have local prototypes; Biscuit ware appears to be derived from Black-on-white. Glaze pottery, being something entirely new, must either have been invented in the area or brought in from the west. But the culture as a whole exhibits a virility and capacity for improvement which to my mind indicates the stimulation of new blood. The fact that it came into being after the abandonment of the San Juan and during a time when there was evidently a more or less widespread shifting of population, makes it reasonable to suppose that many groups drifted in to join the older communities. Although such groups may, and probably did, introduce some elements, their influence looks to have accom-

[1] I here disregard the Middle Gila and Chihuahua areas; it is becoming more and more obvious that their cultures did not form part of the true Pueblo complex.

[2] Tuyonyi is round, some villages are reasonably closely grouped—Pecos in late times, for example—but in general the above description holds good.

plished more in energizing, in conditioning and inspiring change, than in the direct transplanting of culture traits[1].

However it may have been brought about, there was a decided renaissance. Many new towns were founded; some of them grew to very great size. The archaeology of the Pueblo IV period in the Rio Grande has yet to be worked out, but it is already obvious that there were numerous and thriving communities in the Chama drainage, on the Pajarito Plateau, the Jemez, along the whole course of the Rio Grande, in the Galisteo Basin, and in the Manzano country. Pecos, of course, was at that time at the height of its prosperity. There seem to have been two, possibly three, subdivisions of the culture: one in the north, centering perhaps in the Chama; one in the south, including Pecos and centering perhaps in the Galisteo Basin; and the third in the Jemez. This tentative classification is based on pottery, our data upon other traits being still very scanty. The northern group specialized on Biscuit ware, almost to the exclusion of Glaze; a peculiar incised pottery and a micaceous culinary ware were also made. The southern group ran almost as strongly to Glaze. The Pajarito Plateau formed a sort of borderland, some of its sites, Otowi and Tschirege for instance, showing a preponderance of Biscuit; others, like Puyé and Tuyonyi, an equal superiority of Glaze. The Jemez ruins, which have both Glaze and Biscuit (although I do not know their relative proportions) are set apart ceramically by the presence of a distinct local ware, Jemez Black-on-white.

Of Pueblo IV in the Rio Grande, the most flourishing part was evidently the middle. One seems to discern an early phase marked by the gradual gathering together of scattered villages. This occurred, as nearly as we can now estimate, during the 1300s; Glaze I and II and Biscuit A were in vogue at Pecos. The vigorous middle phase lasted from about 1400 to 1500 (Glazes III and IV at Pecos). This was the time of the great communities of the Chama, the Pajarito, the Galisteo Basin, the Jemez; and presumably also of the valley towns from Bernalillo south, although some of the latter, as well as certain of those in the Manzanos, may have reached their largest size somewhat later. It was the Golden Age of the Rio Grande. But it was not destined to last much beyond 1500, for when the Spanish came in 1540 the great majority of the northern sites, including all those of the Chama and the Pajarito, were in ruins, as well as many in the south.

We do not know what brought about the decline. Drought, perhaps; nomadic enemies; a combination of the two? The matter can without question ultimately be settled by archaeological and climatological research. At all events, the number of pueblos listed by Castañeda and the other early chroniclers was much less than it had been very shortly before. The nature of the pottery of this period is not well understood. At Pecos Glaze V was in fashion; something similar was probably being made at most of the other towns, for there are references to glazing in the Spanish accounts. Biscuit had probably disappeared with the fall of the northern communities, but Jemez Black-on-white held on, I believe, and either it or some persisting Dull paint ware derived from Biscuit may have given rise to Modern painted. During the seventeenth century Glaze degenerated badly.

[1] In the Southwest, migration seems usually to have revivified resident cultures and made them susceptible to mutation, rather than to have produced cultural hybrids.

The Pueblo Revolt of 1680, which brought about troubles that were not finally settled until nearly 1700, marks the close of Pueblo IV and the opening of the Modern or Pueblo V period. There was wholesale abandonment of towns, much inter-area migration; and when the eighteenth century dawned the Pueblo tribes were settled on the sites which, with few exceptions, they are occupying today. The Revolt doubtless caused many cultural changes. It may have led to the final disappearance of Glaze ware in the Rio Grande and to the general adoption of Dull-paint. The change, at least, was made at about that time. It should be said, however, that we know next to nothing of any Rio Grande pottery, save that of Pecos, between 1700 and 1870, at which date the collecting and preservation of vessels from the pueblos began.

We may now turn to the specific problems of Pecos ceramics. First comes that of the origin of its Black-on-white ware. There is no evidence that the valley, or the country to the eastward, was inhabited by anyone but nomads during Pueblo I and II. Forked Lightning, the oldest local site, was founded presumably about the middle of Pueblo III by people who brought with them a culture already formed. This culture, judging from the Black-on-white and Corrugated pottery, was probably derived from a Pueblo II prototype of the northern San Juan. It was doubtless altered to some extent during its southeastern spread; it may also have remained for a considerable time in the northern Rio Grande; and have taken on its peculiar local character (or rather lack of character) before penetrating into the Pecos valley. Once established there, its career is marked on the whole by degeneration, which became particularly acute after the move from Forked Lightning to Pecos. Features of late appearance were the outcurved bowl-rim and a "biscuitizing" tendency exemplified by the use of soft paste. Conditions were ripe for the change which was brought about by the introduction of Glaze and Biscuit.

We cannot here discuss the origin of Glaze decoration in the Rio Grande. Mr. Amsden, however, believes that Glaze I, its first manifestation at Pecos, may have derived certain qualities of paste and possibly a few decorative features from Black-on-white. Whether this was so, or the opposite was the case and the latest Black-on-white took on Glaze I attributes, Glaze pottery very quickly reached a position of dominance, Black-on-white completely disappeared and lustreless, dull pigment, now being used only on Biscuit ware, was relegated to a distinctly minor role. It was to occupy this humble position for a long time. It eventually dropped entirely out of use and only returned to favor, on Modern painted pottery, in late times.

Biscuit appeared at Pecos at very nearly, if not exactly, the same time as Glaze. Test graphs give no clear indication that the one preceded or succeeded the other. I used to imagine that the introduction of Glaze caused a general ceramic upheaval, which hastened the development of Biscuit from Pecos Black-on-white. Mrs. Kidder and I, in a former publication, stated that seemingly transitional pieces, representing this postulated development, were not uncommon.[1] Mr. Amsden's work on the Black-on-white indicates, however, that Biscuit was not of local origin. He finds in his Rough-unpolished Black-on-white class a percentage of specimens which become more and more Biscuit-like toward the top of the Black-

[1] M. A. and A. V. Kidder, 1917, p. 356.

on-white series in any given test. But, according to the stratigraphic evidence, these actually overlap the first appearance of Biscuit, and even at that time are still unmistakably Black-on-white, rather than transitional. Biscuit A seems to have arrived full-blown. Mr. Amsden and I therefore now believe that what might be called a biscuitizing tendency grew up in Pecos Black-on-white. Had this trend been allowed to continue, it might ultimately have produced something not dissimilar to Biscuit. But the drift, according to our present hypothesis, was cut short by the introduction of true Biscuit ware, which we think must have developed from Black-on-white in some region outside the Pecos valley. The acceptance of the new style by Pecos potters may perhaps have been facilitated by their being already familiar with a ware (the above-mentioned sub-group of the Rough-unpolished Black-on-white) which was technologically not dissimilar to Biscuit.

The earliest variety of Biscuit is called Biscuit A. It is characterized by unslipped and undecorated bowl exteriors and by certain peculiarities of vessel shape and of decoration. As has just been said, it is apparently not an outgrowth of Pecos Black-on-white. But Black-on-white ancestry it must almost certainly have had. This is indicated by its color, the nature of its pigment, and by the general make-up of its decoration. In searching for the origin of Biscuit one naturally turns to the north, for in the Rio Grande valley above Santa Fe, at certain sites on the Pajarito (Otowi, Tschirege, Tsankawi), along the Chama and at Ojo Caliente, Biscuit is very strongly predominant over Glaze and in many of these ruins it occurs to the practical exclusion of the latter. This northern region is certainly the home of Biscuit B and, although less is known of Biscuit A, it seems likely that further work will show that it also centred there. In the north, then, one would expect to find material transitional between Black-on-white and Biscuit and, as a matter of fact, at Cañones in the Chama drainage and at Cordova in that of the Santa Cruz, are ruins whose pottery seems pretty well to fill the bill[1]. It is almost impossible to say whether the run of this material is Black-on-white or Biscuit A. In the lot from each ruin are a few pieces that are unmistakably of one sort or the other, but the majority are from soft, "dusty"-paste bowls with plain rounded rim and thickish walls; which lack outside slip and whose exteriors have the peculiar scraped texture of Biscuit A. The decoration, as far as can be made out from sherds, lacks the exuberance of Black-on-white but, on the other hand, is not as rigidly standardized as that of Biscuit A. True Biscuit A might well, it seems to me, have developed very quickly from some such ware.

Excavations should be made at Cañones and at Cordova in order to recover larger collections and to find out whether there are horizons of earlier or later deposition which might lengthen out our series and so indicate more clearly the nature of technological and artistic trends. Particularly do we require knowledge of northern Biscuit A. Superficially at least, it is not abundant at the great sites of the Chama and at Ojo Caliente—these show practically nothing but Biscuit B. There are, however, apparently pure Biscuit A ruins on and near the Prado Verde Ranch below Abiquiu. These, too, should be investigated. If Biscuit A did indeed develop

[1] Sherds kindly supplied for study by Dr. Harry Mera from the survey collections of the Laboratory of Anthropology. They were gathered from the surface.

from Black-on-white in the north one has still to account for its introduction at Pecos, a problem which involves the whole matter of the spread of ceramic styles and which can therefore best be considered in a later volume when the evidence of the Glazes is before us.

Biscuit at Pecos was, as has been said, a minor ware. Biscuit A, however, according to the stratigraphic tests, occupied at first a position of fairly great strength relative to Glaze. In Test X, for instance, in the eastern rubbish heap, the percentage in cut 7, the next to lowest (in the bottom cut neither ware is present in significant quantities), is 60 Biscuit A to 40 Glaze; this is the only case in which we have found Biscuit A actually preponderating. In the next cut above (No. 6) Biscuit A drops to 14% and Glaze rises to 86. In Test XI, cut 7, the percentages are: Biscuit A, 20; Glaze, 80. Cut 6 (above 7), Biscuit A, 5; Glaze, 95. In Test XII, cut 7: Biscuit A, 40; Glaze, 60. Cut 6: Biscuit A, 15; Glaze, 85.[1] In Tests XX, XXI and XX combined, the two wares first appear (cut 8) in the following ratio: Biscuit A, 48; Glaze, 52. In the cut above (No. 7): Biscuit A, 42; Glaze, 58. In the next higher cut (No. 6): Biscuit A, 14; Glaze, 86. An average of all the above figures shows 42% of Biscuit A and 58% of Glaze at the time of first appearance; shortly later Biscuit A falls to 12% and Glaze rises to 88%. From that time (i.e. at the height of the Glaze I period) until the final decline of Biscuit at the opening of the Glaze V period, the ratios in any deposit of refuse are approximately the same: Biscuit 15-20%, Glaze 80-85%.

The statistics just quoted of course simply mean that at first Biscuit pottery was relatively more popular than it was shortly thereafter. How this should be interpreted is less certain, but it seems only natural that a Dull-paint ware not radically unlike the long familiar Black-on-white should hold up for a time, particularly among older or more conservative potters, against the increasing vogue of Glaze I. But, once definitely superceded, why should Biscuit have persisted at all? And why so long? There is no evidence that it played any special role, either ceremonial or mortuary. As far as utility goes, a Biscuit bowl would seem to be neither better nor worse than one of Glaze ware, although the greater softness and porosity of Biscuit might conceivably have made it more suitable for some special purpose. But the theory of a restricted function is rendered improbable by the fact that in the north there are many sites where practically nothing but Biscuit was made. Other queries. Did certain women, perhaps of northern origin or with northern affiliations, specialize on Biscuit, or was it part of the output of all potters? Why were no ollas made during Biscuit A; and is this lack peculiar to Pecos, or did it likewise obtain in communities where Biscuit A was the leading ware?

The decoration of Biscuit A also raises problems. As compared to that of Black-on-white its outstanding characteristic is its standardization. The Black-on-white potter allowed herself great latitude in the width of her bands and in the methods used for framing and subdividing them and for filling their panels. She possessed, as well, a far larger assortment of minor figures which were permitted to vary greatly in size and almost infinitely in the details of treatment. This exuberance, however, is accompanied by extremely poor workmanship; it seems an

[1] For figures on these tests see Kidder, M.A. and A. V., 1917.

evidence of carelessness rather than of creative energy; it is entirely different from the riot of decorative experiment that marks such vigorous efflorescences as those, say, of Mimbres and Sikyatki pottery, for in them the painting was done with most meticulous accuracy. Biscuit A conformed to very definite and very limited canons. A few fundamental patterns were used again and again; in detail they vary, but within a surprisingly narrow range. Does this indicate a revolt against the looseness of Black-on-white? Or is it due to timidity and lack of enterprise in dealing with patterns borrowed from a foreign source? But northern Biscuit, as far as we know, is equally standardized. On the whole, the standardization of Biscuit patterns appears to me symptomatic of a general waning of interest in pottery decoration which is also seen in the Glazes and which is, indeed, characteristic of the maturing Rio Grande culture. Another exemplification of the same tendency is carelessness of execution, a striving for broad effects to the neglect of accurate brushwork. This is equally true of the Glazes after Glaze I.

With the decline of emphasis on design there arose in Biscuit (and in Glaze as well) a marked feeling for shape. The local Black-on-white was, in the matter of vessel form, held by no rigid restrictions. There were, it is true, fewer types of pots than in most other Black-on-white groups, but there are many more than in Biscuit A, and the Forked Lightning and Pecos Black-on-white bowl has a far greater range in size, silhouette, and rim contour; there is, one might say, no definite pattern at all; and the moulding is slipshod and haphazard. Biscuit A bowls, however, are excellently moulded, their walls are of uniform thickness, their outlines are graceful, their roundness is nearly perfect, their rims carefully and consistently finished.

To return to Biscuit A decoration. The two common patterns, the Bar paneled band and the Standard band, are basically allied to each other in number of panels, in the oblique "a, b, c" subdivision of the panels and in the cutting off and blacking of the corners of the "a" triangle. Without design analysis this relationship might not be recognized, as the complete patterns are not superficially very much alike. The Bar paneled pattern is apparently the older. The Standard band I think developed from it, but whether this happened at Pecos or was accomplished elsewhere and the revamped design was introduced, is uncertain. If the change took place at Pecos it would seem to have been in the nature of a mutation brought about by the inventiveness of some single decorator, for we do not find local pieces that appear to be transitional. If it occurred in, say, the north it might have been a natural and relatively slow simplificational metamorphosis; or, again, it may even there have been a mutation. Fuller data from other Biscuit A sites may solve the problem, for, thanks to design analysis, we know the two patterns intimately and shall therefore at once be able to recognize intermediate examples.

The *awanyu* was also an integral part of the equipment of the Biscuit A decorator. What was its origin? A pair of *awanyu*-like figures are seen in a Pecos Black-on-white bowl (fig. 14, *c*); a specimen from the nearby Black-on-white Rowe ruin bears not dissimilar figures. They may well be representatives of a form ancestral to the Biscuit *awanyus*. Even these Black-on-white examples are evidently something more than purely geometric devices. They are not of course realistic; symbolic

is perhaps a better term, and of some symbolic significance the Biscuit A and B *awanyus* almost certainly were.

So much for Biscuit A. Biscuit B, its successor, is technically closely similar, but the exteriors of its bowls are slipped and decorated and ollas began to be made; decoration becomes even more rigidly standardized. Biscuit B is without question derived directly from the earlier ware; exterior embellishment is a natural enough elaboration which, indeed, had been experimented with during Biscuit A; the patterns obviously come from Biscuit A prototypes, the Standard band of Biscuit B being without question an altered and simplified form of the Standard band of Biscuit A. But once more the history of the transition is obscure. It might well have taken place locally. One could select a reasonably convincing developmental series from the Pecos collection. Possibly Pecos was indeed the scene of the transition. Doubt arises, however, because of the humble position of Biscuit at Pecos as contrasted with its importance in the northern ruins. One does not expect leadership in style change to emanate from places where a given cultural trait is weak. Northern Biscuit B is almost identically like that of Pecos and, as it seems extremely unlikely that the two groups could have developed independently along exactly the same lines, one must believe that if Pecos were the cradle of the new manner it influenced the much more solidly Biscuit-making north. It is therefore much more probable that exterior decoration first began to be practised in the Chama and that the custom more or less quickly worked its way down to Pecos. Possibly the bowls with Biscuit A patterns both inside and out (figs. 49, 50) represent the first attempts of Pecos women to follow a new northern fashion.

Biscuit B is, from the point of view of decoration, just as conventional as Biscuit A; the Standard band is used with dreary monotony. In the matter of vessel shape, on the other hand, there is more variety: the olla appears, the bowls have a greater range in size, there is less uniformity of rim. It should be remembered, however, that as Biscuit B was probably made for a considerably longer time than was its predecessor, this variability may be more apparent than real, and that at any given period there may have been reasonable consistency of form. That there were chronological changes is evident. We have already referred to the heightening and straightening of the rim and to the progressive yellowing of the slip. The patterns, as well, show changes: the Filling key drops out of the reserved rectangle in the Standard triangle; the corners of the Standard triangle are cut off less squarely; brushwork becomes, I suspect, progressively worse. All in all, Biscuit B seems to degenerate as time goes on. This is perhaps to be expected. It was, as we have seen, always a secondary ware and its manufacture was ultimately dropped for good at or near the opening of the Glaze V period, somewhere in the neighborhood of 1500 A.D. Once again we are unable to evaluate the role of Pecos potters in the changes that took place. Were parallel phenomena going on in the north? Did the final extinction of Biscuit at Pecos follow the fall of the great Chama and Ojo Caliente towns? The latter were not occupied when the Spaniards came in 1540, but had probably only recently been abandoned. We need fuller data as to the archaeology of the up-river district.

Before passing to consideration of Modern painted pottery we may say a word

regarding Jemez Black-on-white, a Rio Grande Dull-paint ware which has not been described in this book because it was not made at Pecos. I can unfortunately present very little information as to its range, age, technology or decoration because I have not worked in the region where it occurs, nor have I had opportunity to study such collections of it as exist. It appears to centre in the drainage of the Jemez river and to be contemporaneous with Glazes III and IV and Biscuit B. How much longer it persisted, I do not know. The ware is thick like Biscuit, but apparently harder and firmer; bowls are covered within and without by a smooth whitish slip; decoration is in black. Superficially, it has resemblance to, but it should doubtless be distinguished from, older Black-on-whites. Judging by what little I have seen I would guess that, like Biscuit, it is a late specialization from Black-on-white but that, technically at least, it clung somewhat closer to earlier standards. It was evidently less widely distributed than Biscuit and was little traded, for I have not observed it on the surface of ruins on the Pajarito Plateau or the Chama, nor has it appeared (save for a single rather doubtful sherd) at Pecos. In spite of its restricted range the ware is of much interest. If both it and Biscuit prove to be descended from an older Black-on-white, we shall have valuable material for studying their divergent evolution from a common ancestor. The determination of its relationship to Biscuit and the Glazes, and the delimitation of its territorial and chronological ranges will be most instructive. And it may possibly have played some role, as will later be shown, in the development of Modern painted. Finally, it will be useful to know whether it can be separated, as can Biscuit, into early and late classes. Many of these points will be cleared up and we shall be able properly to evaluate the significance of this important ware when data have been published regarding the extensive excavations carried on in the Jemez Valley ruins by the Museum of New Mexico and the School of American Research. The careful work done there by Dr. Hewett and the many students that have attended, under his direction, the sessions of the Summer School of the University of New Mexico must of course have resulted in recovery of a wealth of information upon its technology, decoration, stratigraphic position and archaeological significance.

We now reach Modern painted pottery, the last of the Dull-paint wares of Pecos. It came into vogue at the close of Glaze times. After it had superceded Glaze VI it was the only decorated pottery made. As to the nature of the shift; as to how rapidly, for example, it became dominant, we can only guess, for the upper layers of the Pecos middens have eroded so badly during the century which has elapsed since the abandonment of the pueblo that we were unable to recover any very satisfactory stratigraphic evidence upon anything subsequent to Glaze V[1]. In the ruined rooms, however, and here and there upon the top of the mesa, there occurred beds of late rubbish some of which contained a mixture of Modern painted and Glaze VI, others Modern painted alone. It can therefore be inferred that the two wares existed for a time at least side by side.

At just what date the new style reached Pecos is not certain. It was surely after the occupation of New Mexico by the Spaniards in 1600, but whether before or after the Revolt of 1680-1690 is hard to say, because the pueblo, unlike so many

[1] See graphs in Kidder, M. A. and A. V., 1917.

others, was neither abandoned nor burned during that time of upheaval, and consequently we have no indication in the middens or the ruined buildings accurately to tie the Revolt into our cultural chronology. But Nelson has shown that Modern painted ware appeared at San Marcos and other Tano villages just before the Revolt[1] and it is likely that Pecos did not lag far behind.

Modern painted ware of Pecos resembles Biscuit only in that it is decorated with lustreless vegetable pigment. Modern paste is somewhat "woodeny", but is harder than that of Biscuit; it is also of a warmer, darker color. The vessels are of quite different shapes; red slip (never used on Biscuit) is present on some part of every Modern bowl and olla; Modern decoration, with its wealth of varied detail and its abundance of curvilinear treatments, seems to have practically nothing in common with that of Biscuit. But in spite of these wide divergences, I have a strong feeling that the one is an outgrowth of the other. There is practically no evidence, it must be admitted, to support this belief, except that the latest Biscuit at Pecos seems to run to high rimmed bowls and to become yellower in color; and that Modern patterns are very frequently laid out, like those of Biscuit, on oblique lines. Modern decoration, on the other hand, obviously derives certain elements from the Glazes; in shape the vessels have Glaze prototypes; red slip is, of course, a Glaze trait. The ware therefore presumably has a mixed ancestry, but I suspect Biscuit to have had a share in its begetting.

Where did this pottery originate? It cannot well have been at Pecos, if Biscuit played any part in its development, for Biscuit had gone out of use there at least a century and a half before Modern made its appearance. Once more we turn to the north, but our old refuge, the Chama country, is now closed to us because its formerly thriving communities had been deserted for nearly two hundred years. The Pajarito towns were likewise in ruins, so we must look either to the Jemez or to the pueblos along the Rio Grande. In either centre Modern painted ware might have developed from Jemez Black-on-white or from Biscuit, assimilating certain Glaze attributes, and have remained, so to speak, in seclusion, exerting little or no outside influence, until the ferment of the Revolt permitted its rapid diffusion, a process which certainly should have been rendered easy by the extreme degeneration of seventeenth century Glaze. Nelson suggests that Modern painted ware may have come from the Keres district west of the Rio Grande, for he found evidence that it was being made there (at Pueblo Kuapa) in pre-Revolt times[2].

Although in a search for the origin of any Dull-paint ware in the Rio Grande one naturally first considers the general up-river region where such paint was always most strongly intrenched, we should not neglect less likely districts. There may have been no Dull-paint "hang-over" anywhere in the whole area. If so Modern may have sprung into existence at Pecos itself. Pecos, being at that time a very large and vigorous town, might have exercised a ceramic leadership which it had failed, except in the possible case of the first Glazes, to demonstrate in earlier periods. Or the genesis of Modern painted ware may have been among the pueblos of the Manzanos. Finally, there is possibility of its introduction from the Hopi towns, but that seems to me very improbable, because the vessel shapes, decorations and pig-

[1] Nelson 1916, p. 176. [2] 1916, p. 176.

ments of the Hopi pottery of that period are radically different from Pecos modern painted. At Zuni, Glaze was seemingly still in use in the late seventeenth century. As to Acoma we know nothing.

Our materials for the study of Pecos Modern painted are not satisfactory. The upper, later parts of the rubbish heaps have, as has been said, suffered such severe erosion that the strata containing representation of the ware have mostly been washed away; the remaining portions are badly mixed. We did discover several pure Modern deposits on the mesa top, but these are of limited stratigraphic value. No specimens came from graves, because Christian burial rites evidently forbade the offering of mortuary pottery. Only a few restorable vessels were recovered from rooms. Hence we can say very little regarding the career of the ware at Pecos. Changes doubtless took place, but their nature is uncertain. I believe, however, on the evidence of certain refuse beds which seem to have been laid down shortly before the pueblo's abandonment, that there was increasing elaboration of pattern and that red paint came more and more into favor. If this is so, Pecos would appear to have been tending toward the artistic canons of later nineteenth century San Ildefonso and away from the more severely geometric style of the same period at Santo Domingo.

To compare even the latest Pecos pottery with that of pueblos which are now occupied involves bridging a gap of some seventy-five years, for although Pecos was occupied until 1838, it can hardly be expected to have made much cultural progress after the opening of the nineteenth century; and our first acquaintance with the pottery of the villages of today comes from specimens collected no earlier than 1870, which presumably were made not long before that date. But Pecos Modern painted obviously belongs to the same ceramic category as do the vessels of San Ildefonso, Tesuque, Cochiti and Santo Domingo. More intensive study based on larger and more representative collections ought to permit reconstruction of the development of the category as a whole and recognition of the strains producing the distinct specializations now seen at the above mentioned towns.

The reader will have remarked, in the foregoing pages, a rather consistent avoidance of definite conclusions. This non-committal attitude has consciously been adopted. First of all, we are confronted at every step by paucity of data, due to lack of excavation in one region or another, or to lack of publication of the results of such excavations as have been made. But of even greater weight has been the feeling that this is not the time to force fragmentary information beyond its most obvious and certain applications. Further exploration and digging will supply us with a much greater corpus of facts, which continued studies like those of Miss Bunzel[1] on the psychology of primitive art will enable us to evaluate with far greater assurance than is now possible. Preconceptions, theories based on incomplete data, or upon data whose significance is misunderstood, have been the bane of cultural anthropology. But in the Southwest, where we have so splendid an opportunity to recover the entire life history of a culture and where we can correlate our archaeological findings with the results of environmental, racial and sociological researches, we should hold ourselves, for the time being at least, to a strictly empirical point of

[1] 1929.

view. We already know a great deal about the Southwest, but our investigations are only just beginning to result in the sort of detailed, positively ascertained and provable facts which alone can permit us to draw sound inferences as to cultural evolution. We need much more work, intelligently planned and faithfully executed. Above all things the results of such work should be carefully digested and promptly and fully published.

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